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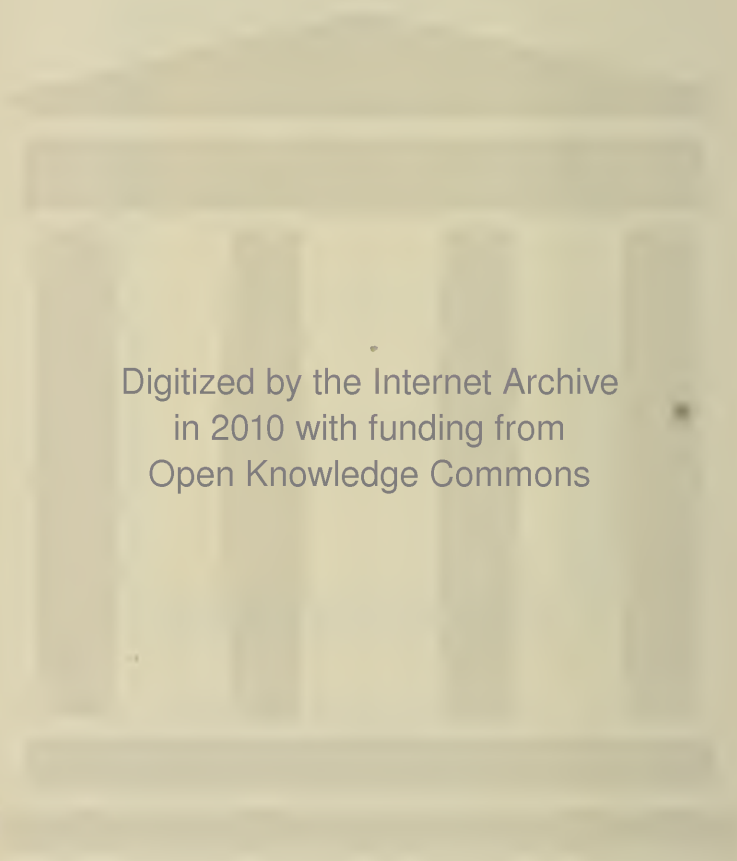
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FIRST ANNUAL REPORT

OF THE

PROVINCIAL BOARD OF HEALTH

OF ONTARIO -

BEING FOR THE YEAR 1882.

Printed by Order of the Legislative Assembly.



Toronto:

PRINTED BY C. BLACKETT ROBINSON, 5 JORDAN STREET.

1883.

PROVINCIAL BOARD OF HEALTH OF ONTARIO.

WILLIAM OLDRIGHT, M.A., M.D., *Chairman.*

CHARLES W. COVERNTON, M.D.

HORACE P. YEOMANS, B.A., M.D.

FRANCIS RAE, M.D.

JOHN J. CASSIDY, M.D.

JOHN GALBRAITH, M.A., C.E.

PETER H. BRYCE, M.A., M.B., *Secretary.*

ERRATA.

Page 6, line 39, for "Redmour" read "Ridenour."

- " 10, " 2, strike out the word "received."
- " 10, " 17, for "public funerals" read "burial permits."
- " 10, " 29, for "Cutter" read "Cutler."
- " 10, " 30, for "Stattuck" read "Shattuck."
- " 16, " 26, for "convince all" read "convince everybody."
- " 17, " 3, for "control" read "the benefits of control."
- " 21, " 15, for "Wright's" read "Wight's."
- " 26, " 4 from the bottom, for "at least" read "or where at least."
- " 28, " 28, for "in something" read "somewhat."
- " 29, " 12, for "or if different" read "or requires them, if different."
- " 29, " 15, for "recepticles" read "receptacles."
- " 29, " 3 from the bottom, for "passing" read "making."
- " 30, " 18, for "Suspicious, and Facts" read "Suspensions and Facts of."
- " 30, " 34, for "circumstances" read "purposes."
- " 30, " 35, for "with immigrants" read "to the immigrants."
- " 31, " 18, for "hours" read "press."
- " 32, " 26, for "sewage" read "sewerage."
- " 33, " 3, after "Earthenware" add "Drain Pipes."
- " 33, " 22, for "New State" read "New York State."
- " 42, " 9 from the bottom, for "Marey" read "Marcet."
- " 54, " 10 and 11 from the bottom, for "I" read "we."
- " 68, " 2 from the bottom, for "in, their" read "in their."
- " 85, " 34, for "As to whether" read "That."
- " 92, " 18, for "the" read "two."
- " 92, " 8 from the bottom, for "force" read "free."
- " 92, bottom line, for "position" read "portion."
- " 93, line 25, for "B.M." read "D.M."
- " 93, " 27, for "visited" read "revisited."
- " 93, " 35, for "sewage" read "sewage."
- " 93, " 41, for "in" read "viz."
- " 93, " 43, strike out the words "connected therewith."
- " 94, " 7, for "whereas" read "when."
- " 94, " 27, for "when" read "then."

75476



FIRST ANNUAL REPORT

OF THE

PROVINCIAL BOARD OF HEALTH.

OFFICE OF THE PROVINCIAL BOARD OF HEALTH,
PARLIAMENT BUILDINGS,
TORONTO, Dec. 1st, 1882.

*To His Honour the Honourable John Beverley Robinson,
Lieutenant-Governor of the Province of Ontario.*

MAY IT PLEASE YOUR HONOUR:—

The Provincial Board of Health begs leave respectfully to present this, its First Annual Report.

In order that the nature of the work undertaken by the Board and the methods by which it has been carried out may be more clearly seen and more readily understood, it has been thought well to classify the various subjects treated of in this Report under eight heads. The Board has preferred this method, trusting that by it the matters referred to will appear more interesting and more readily attainable than if the various diverse subjects were loosely arranged in chronological order throughout.

The contents of the Report thus naturally divide themselves into three parts:—

PART I.

Contains the Report, proper, of the Board, arranged under the eight following chapters:—

CHAPTER I.—Organization of the Board.

“ II.—Collection of Sanitary Information.

“ III.—Dissemination of Sanitary Information.

“ IV.—Investigations into the Causes of, and Remedies for, various outbreaks of Disease.

“ V.—Action taken in cases of various reported Nuisances and Unsanitary Conditions.

“ VI.—Collection of Statistics of Prevalent Diseases.

“ VII.—Relations of the Board to various Classes.

“ VIII.—Work to be done.

PART II.

Contains the Appendices to the Report proper, arranged alphabetically so as to correspond with the chapters of Part I. The contents of the various Appendices are as follows :—

APPENDIX A.

- ARTICLE I.—Copy of Act, Chap. 29, 45 Vict., establishing a Provincial Board of Health.
 “ II.—Condensation of the Minutes of Proceedings of the meetings of the Board.

APPENDIX B.

- ARTICLE I.—Report of the Commission for obtaining Sanitary Information in Great Britain and Europe.
 “ II.—Report of the Commission appointed to visit Boston, New York and Albany, to obtain information concerning Vaccine Farms and other Sanitary matters.
 “ III.—Report of the Delegate to the International Sanitary Congress at Geneva.
 “ IV.—Report of the Committee appointed to attend the Sanitary Convention at Greenville, to visit the Offices of the State Board of Health of Michigan, and the Health Departments of Detroit and Toledo.
 “ V.—Circular to the Clerks of Municipalities.
 “ VI.—Circular to Physicians.

APPENDIX C.

- ARTICLE I.—Pamphlet entitled “ How to Check the Spread of Contagious or Infectious Diseases.”
 “ II.—Circular sent to Clergymen, High School Teachers, and Public School Inspectors with copies of Pamphlet (Article I.).
 “ III.—Copy of a Sheet of Directions for the Resuscitation of the apparently Drowned, etc.
 “ IV.—Memorandum forwarded with other Documents of the Board to Clerks, Physicians, etc., concerning the Powers and Duties of Municipal Authorities respecting the Public Health.
 “ V.—Classification of Diseases.

APPENDIX D.

- ARTICLE I.—Report of the Commission of Investigation into the outbreak of Typhoid Fever at Sarnia.
 “ II.—Report of the Commission of Investigation of the endemics of Malaria at Cobocok and Madoc.
 “ III.—Report of the Investigation into the outbreak of Typhoid Fever at Stratford.
 “ IV.—Report of the Committee of Investigation into the outbreak of Typhoid Fever at Lambton Mills.
 “ V.—Report regarding Sewerage, Disposal of Sewage, and Water-supply of Toronto.

APPENDIX E.

- ARTICLE I.—Report of the Commission on Immigrant Inspection Service.

APPENDIX F.

- ARTICLE I.—Report of Committee on Disease Reports.
 “ II.—Form of Circular addressed to Medical men requesting their active co-operation in the work of collecting Disease Reports.
 “ III.—Circular of Directions to Correspondents.
 “ IV.—Copy of the *Weekly Health Bulletin*.
 “ V.—Circular of Explanation of the *Weekly Health Bulletin*.

APPENDIX G.

ARTICLE I.—Catalogue of Books and Exchanges.

APPENDIX H.

ARTICLE I.—Report of Committee on Legislation.

PART III.

Contains the following :—

ARTICLE I.—The Chairman's Inaugural Address.

- “ II.—Report of the Secretary of the St. Thomas Sanitary Convention, embodying Papers by—
 Dr. Oldright, on “The Aims and Objects of Sanitary Conventions” (Introductory).
 Judge Hughes, on “Adulteration of Food.”
 Dr. Ellis, on “Contamination of Drinking Water.”
 Dr. R. W. B. Smith, on “Contagion.”
 Prof. Austin, on “The Public Schools and the Public Health.”
 Dr. J. Coventry, on “Prevention and Restriction of Controllable Diseases.”
 Dr. Cassidy, on “Heating and Ventilation of Buildings.”
- “ III.—Lecture by the Secretary, under the auspices of the Galt Mechanics' Institute, on Zymotic Diseases, their Causes and Prevention.
- “ IV.—Lecture by the Secretary before the Brant County Teachers' Association, on School Sanitation, its Necessity and Methods.

PART I.

CHAPTER I.

ORGANIZATION OF THE BOARD.

1. *The Necessity for such a Board.*—As remarked by Dr. Henry I. Bowditch, who delivered the centennial discourse on Public Hygiene before the International Medical Congress of 1876, “theoretically Public Hygiene is the most important matter any community can discuss, for upon it, in its perfection, depend all the powers, moral, intellectual and physical, of a State.” Recognizing a growing belief on the part of the people in the axiomatic truth of this statement, carefully appreciating the opinions of the general public, and being actuated by an earnest and solicitous concern for the welfare of the people over whom it has been called to rule, the Government last session introduced a Bill, and the public representatives in the Legislature agreed to its clauses, establishing a Provincial Board of Health for Ontario, having close relations with all Local Boards, which might, under the Act (36 Vic. cap. 43), be already in existence, or be organized in the future.

That such a Central Board should be established permanently to discuss measures for concerted action on the part of the Government in such extensive public questions as those of Immigrant Inspection, in common with the Dominion authorities and the National and State Boards of the neighbouring Union, seems reasonable; that the Government should assume it to be its duty to enquire into the preventable causes which, as in the case of undrained lands, and lands drowned by dams on rivers, create widespread epidemics of malaria and other diseases too extensive for local municipal action, seems just; and that in its relations with municipalities it should have thought it wise to make such relations more intimate by giving to a Central Board power to confer with and advise Local Health Boards concerning health matters requiring municipal attention and municipal reform, are facts so patent that it may be doubted if any will be found who challenge the wisdom of such a course.

To some it may, however, have appeared that the municipal machinery in existence would have obviated any great necessity for a Central Advisory Board; or to others that the average health of this Province is so good that but little is left for Preventive Medicine to do. But if it be remembered for a moment what an enormous proportion of deaths out of the 19,802 in a population of 1,890,000 which took place in Ontario in 1880, was due to preventable causes, or what are called zymotic diseases, there can be no persons who would not grant that there is much yet to be done.

With a vigorous and energetic population; with a high degree of general prosperity, and a more than average degree of education and refinement; with a clear atmosphere and moderate climate, and with a medical profession high in the scale of scientific ability, we have yet to confess the undesirable fact that our mortality per thousand for the whole country (with returns as yet not wholly perfect), is at least eighteen; while in some European cities, where we are accustomed to suppose that the results of long years—even generations—of “poverty, hunger, and dirt,” have produced almost ineradicably baneful effects, the death-rate is very considerably less, as, for example, in Geneva with a death-rate not exceeding fifteen per thousand.

That there is, then, a necessity for such a Board must be evident to all; and that the efforts of Sanitary Boards have produced most appreciable results is seen in the fact, as stated by Edwin Chadwick, Esq., K.C.B., London, England, that in the decade between

1872-82 there has been a decrease of four and a half per cent. in the death-rate of England and Wales, from that of the preceding thirty years, or in other words, 250,000 persons were living in 1882 who would have been dead, had the death-rate of the previous period continued.

2. *Composition of the Board.*—Shortly after the passing of the Act above referred to (Public Health Act of 1882), the following gentlemen were appointed to and accepted positions on the Board.

William Oldright, M.A., M.D. (Professor of Sanitary Science, Toronto School of Medicine), *Chairman*.

Charles William Covernton, M.D. (Professor of Sanitary Science, Trinity Medical School).

John J. Cassidy, M.D. (Surgeon to General Hospital, Toronto).

John Hall, M.D., Toronto.

Francis Rae, M.D., Mayor of Oshawa.

Horace P. Yeomans, B.A., M.D., Mount Forest.

By a subsequent Order in Council, the Secretary of the Board, Peter H. Bryce, M.A., M.B., L.R.C.P. & S., Edin., was appointed and entered upon his duties on the first day of May.

The Board thus constituted held its first regular meeting on the ninth day of May for the purpose of organizing, and for the conduct of business. It may here be mentioned, however, that active work had been already begun by the appointment of a commission consisting of the chairman, Dr. W. Oldright, and Dr. J. J. Cassidy, who made a visit of inspection into the methods of working of the State Board of Health at Lansing, Michigan, and of the City Boards of Health of Detroit and Toledo. In addition to this, a commission, consisting of Drs. C. W. Covernton and H. P. Yeomans, visited Sarnia, making there an investigation into the causes of a serious outbreak of Enteric (Typhoid) Fever.

So much work arose from action inaugurated at the first meeting that a special meeting of the Board was shortly afterwards held on the sixth of June. In addition to this another special meeting was called for the twenty-seventh of June, at which previous work was completed and new work undertaken.

Subsequent regular meetings were held under Clause 5 of the Act, on the 5th of September and the 30th of November.

A *résumé* of the work undertaken and completed at these meetings will be found in the condensation of the minutes of the various meetings, in Appendix A (Article II.) of this Report.

Dr. John Hall having resigned his position, owing to the urgency of other duties, the appointment of John Galbraith, M.A., Professor of Engineering in the School of Practical Science, was made—he entering upon his duties in November.

3. *Elements in the composition of the Board.*—Naturally in the composition of any Board of Health the public expects to find the great proportion of its members medical men. But that other elements have and do enter into the composition of such Boards is well known; while it may not be so well known that it is to a layman, Mr. Lemuel Shattuck, of Boston, that Massachusetts, the first American State to establish a Board of Health, owes the first report of a Sanitary Commission; and that it is to a London barrister, Edwin Chadwick, Esq., K.C.B., that England owes the most strenuous and life-long efforts in the cause of Preventive Medicine.

Hence it seems a wise provision that there may be at least three of the members of the Provincial Board of Health, as at present constituted, laymen or from professions other than the medical.

On many city Boards, and on some State Boards in the United States, are to be found lawyers, the peculiar functions of whom it would seem to be, to advise the Board as to the legal bearing of actions undertaken by it. The presence of such a gentleman on the Provincial Board of Health would seem very desirable, since he would be specially competent to advise in questions which frequently present themselves regarding the various Health Acts already existing, or to recommend such new legislation as executive emergencies, which may arise, would seem to warrant.

But another desideratum in the constitution of a Health Board is the presence upon it of some gentleman having the *status* of a professional engineer, whose skill may be called into requisition in giving advice in the many details, which arise in connection with questions of sewerage and drainage systems, water supplies, etc. Such a gentleman the Government has secured in Prof. Galbraith, of the School of Practical Science.

Of the medical portion of the Board, the chairman and one other member, are lecturers on Sanitary Science, in two medical colleges, while the other members are well known practitioners. The Secretary, likewise, is a medical man.

CHAPTER II.

COLLECTION OF SANITARY INFORMATION.

1. *Sources of Information.*—As would be naturally assumed, various members brought to bear on the work much special knowledge concerning those subjects likely to engage the attention of the Board. But, although this was true, yet there was a great necessity for literary works, bearing more particularly on sanitary matters, being obtained for perusal by its members. This has been obtained in a large degree by means of exchanges from foreign Boards of Health—especially those of various States of the Union,—and by medical journals from different sources. A small amount of literature, consisting of some sanitary magazines and works on analyses of foods, air and water, has been purchased.

Another very valuable source of information has been the attendance of members of the Board at various Sanitary Conferences. The first visit of this kind made, was by two members, Drs. Oldright and Cassidy, to a Convention held at Greenville, Mich., in April, under the auspices of the Michigan State Board of Health. Papers were there read on a number of important sanitary subjects; discussion on these took place, and was engaged in by the delegates from this Board. Through this means they returned with many new and useful ideas on sanitary subjects, some of which have been acted upon in the work of the past year.

Another such visit was that paid by Dr. C. W. Covernton to the International Congress of Hygiene, held in September last, at Geneva, Switzerland. The Board thought it wise to take the opportunity of this gentleman's presence on the continent at this time to request him to attend the Congress as a representative of the Provincial Board. It has been owing to his presence there as a Canadian delegate, and also to the fact of his having employed much valuable time in collecting information both on the continent and in Britain, that the progressive spirit, shown by the Canadian Province of Ontario, has been spoken of in such commendatory terms by the leading medical journal, *The Lancet*, of London, England. The report of Dr. Covernton, as also that of the delegates to Michigan, printed in Appendix B, will be found to contain much valuable information.

Another means which has been freely made use of by this Board, has been the visiting of Sanitary Boards in various places both in Britain and the United States. The first information obtained in this way was that obtained by the delegates, previously referred to, who visited the Michigan Health Convention. At this time visits were made to the State Board, at Lansing, Mich., where they were received with great cordiality by the Secretary and other officers; and obtained from them very extended and complete information along with copies of all forms used by that Board in the execution of its extensive work. Information, too, was obtained from the officials of the Detroit Board of Health, and also from those of the Toledo Board.

Such information and the documents obtained by these delegates have proved extremely valuable to the Secretary in the numerous duties which have fallen to his lot in the labour of organization of the office work of the Board. The large amount of knowledge, obtained during this visit has been supplemented with that obtained by the Chairman and Secretary in an inspection they were commissioned to make into the methods of working of the State Boards of New York and Massachusetts, and also those of some of the larger American City Boards, such as those of Boston and New York, where organizations are at work performing labours requiring the annual expenditure of large sums of money, amounting in the case of New York to some \$700,000. The work implied by such a vast organization seems almost incredible; but when it is recollected that the sanitary well-being of over one million souls has to be cared for, we

cease to be surprised. As will be seen, under Appendix B, much special knowledge, pertaining to city Boards was then obtained.

Detailed information concerning the conduct of vaccine farms was also obtained, notably concerning that carried on at Chelsea, near Boston, by Dr. Cutler, who with much courtesy showed the delegates the complete arrangements of the establishment and the *modus operandi* employed in the preparation of *bovine virus*. Detailed information of the process will be found under Appendix B, along with the report of the Commission of Inspection into the working of the State Boards of Massachusetts and New York, as well as of the city Boards of Boston, New York and Albany.

2. *Difficulties to be overcome in the collection of Sanitary Information.*—The sources from which information concerning the working of Boards similar to the Provincial Board of Health could be obtained were wholly outside of the Dominion, and hence, as might be expected, modifications in their methods of working to adapt them to our municipal institutions have in some cases appeared necessary.

The sanitary information, which this Board has been able to obtain in Canada, has been chiefly the documents of the recently formed city Board of Montreal. In response to a circular issued to the clerks of the various municipalities of Ontario, the Board has found that Local Boards of Health have been formed in comparatively few cases; and consequently sanitary information, concerning the various localities, has been very meagre. The Board takes pleasure, however, in stating that under the influence of the circulars and by the hearty aid being lent to the efforts of the Board by the profession everywhere, many Local Boards have been or are being formed, from which it is expected much useful information will gradually be obtained.

3. *Successful results of the Board's efforts to obtain Information.*—That the Board has, however, been successful, in spite of difficulties, in obtaining a large amount of information, will be seen on examining the large number of exchanges, referred to in the library catalogue (Appendix G), by the appended reports of materials obtained from Boards in various States of the Union, and from those in England, Ireland, etc., and by the reports of a large number of investigations of outbreaks of disease which have occurred in various parts of the Province.

These various materials will not only form the nucleus of a sanitary library, but will supply useful materials for reference in the future. Another source of information from which the Board looks for great results has very recently been inaugurated. This is the system of Weekly Disease Reports. As, however, a detailed explanation of that adopted in the Reports will be given in another chapter, its consideration will, in the meantime, be deferred.

CHAPTER III.

DISSEMINATION OF SANITARY INFORMATION.

1. *The Necessity for its Dissemination.*—As remarked by a recent writer, “the public, ignorant of sanitary laws, have hitherto paid little or no attention to Public Hygiene, except when, under influence of some frightful epidemic, the panic-stricken nations have been aroused from their usual apathy, and have then vainly tried to resist the pest by drugs, by appeals to the gods whose laws they have never studied; or finally, perhaps, by legal enactments after the days of suffering are past.” Though, perhaps, it would be too much to say that this remark is applicable to the people of Ontario to-day as a whole; yet there is no doubt that but little thought is given to sanitary matters until some fatal epidemic is present or is threatened, when all wildly seek for relief in some external authority or aid, never dreaming that sanitation like charity begins at home.

The necessity for a more general knowledge of sanitary laws in the many varying conditions which make up ordinary social life, is so apparent to everyone as not to need proof. How few houses in the land have arrangements made in them for good ventilation and rational systems of warming; how few households take precaution against the infection of wells, and the air of their houses, by cesspools and open privies; and how few villages, towns and cities have adopted any systematic cleansing of streets or house-premises, or have adopted precautions against the spread of infectious diseases by the isolation of the sick, or by preventing children from infected families spreading the contagion in the public schools.

This condition of affairs must be due, either to a lack of appreciation of the detriment to the general health which the neglect of sanitary laws entails, or from an insufficient knowledge of the means to be taken in remedying such evils. Feeling the urgency for the adoption of more extended sanitary measures by the public at large, the Board of Health, at its first meeting, decided to immediately put itself in communication with the various municipalities concerning their sanitary condition.

2. *Ends to be obtained by the Dissemination of such Information.*—These are various, inasmuch as, adopting Dr. Bowditch's words, “Public Medicine—as it is called by Dr. Cameron, of Dublin—aims at preventing all forms of disease which may be prejudicial to the moral, intellectual, and physical well-being of the people.” It aims at promoting their moral well-being by teaching the injurious effects of such social habits as the intemperate use of alcoholic liquors, opiates and other pernicious drugs; it not only aids in the intellectual advancement of the race, by opening up new fields for study in its connections with the various branches of moral, mental and physical science, but it also tends to the conservation of intellectual vigour by pointing out, amid other dangers, those which are incident to the busy epoch in which we live; whilst, finally, it endeavours to promote the physical health of the people by instructing them in the nature of the physical laws which govern their own bodies, as regards air, food, exercise, dress, and the numerous other details which belong to the every-day life of the individual.

3. *Methods of Propagation Adopted.*—As will readily be seen the task which Sanitary Science sets itself is a most extensive one. But men have been thousands of years examining the problem, and something has been done. Should anyone think that but little progress has been made, we need only point to the fact, that within a hundred years infant mortality has been reduced by better ventilation, better clothing, better food and greater cleanliness from seventy-five per cent. of all births to a little over twenty-five per cent., in order to prove that though

“Science moves but slowly, slowly, creeping on from point to point,”

still it does advance. The first step, with such ends in view, adopted by the Board, was

one for the improvement of local municipal organization in matters relating to the public health. A circular was addressed to the clerk of every municipality in the Province, inquiring whether it had taken advantage of the powers given under the Health Act (Cap. 190, R. S. O.) for the establishment of a Local Board of Health, and for the passing and enforcing of by-laws, tending to the improvement of the public health; and urging that it take such action in case it had not already done so. In addition to this a circular letter was sent to the two thousand physicians of the Province, asking them to use their influence in the same direction in their respective localities. Not only this, but the municipalities were from time to time invited to inform the Board of their various local sanitary conditions, after the obtaining of which the Board would be happy to aid them in taking any action, deemed necessary in the public interest, and to supply them with such sanitary literature as might from time to time be published by the Board.

The next step was to publish a pamphlet entitled "How to check the spread of Contagious Diseases," copies of which—along with a copy of the Health Act of 1882, and a memorandum of instructions concerning the powers and duties of Local Boards—were sent to every municipality and to every physician. The distribution of the pamphlet was still further extended: a copy was sent to every clergyman in the Province and to every High School teacher; and a sufficient number to every Public School inspector to supply all or most of the teachers coming under his jurisdiction.

Various items of information relating to the public health have also from time to time been communicated to the public through the leading journals.

The next step of importance was the holding of a Sanitary Convention at St. Thomas. At this convention, held with the intention of bringing the Board into direct relations with the general public, papers on sanitary subjects were read by medical gentlemen and gentlemen of other occupations, at each session; after which discussion was carried on, on the subject of the paper, by any persons of the general audience who might desire to do so.

A number of important subjects were discussed, some of the most important being the "Adulteration of Foods," the "Contamination of Water," the "Ventilation of Dwellings," the "Isolation of Infected Persons during Outbreaks of Contagious Diseases;" and a paper on "Sewerage of Towns." The reading of these papers elicited much information in the general, interesting, and animated discussions which followed. The good which must accrue from such conventions, where scientific subjects are treated of in a popular manner, in both interesting and educating the public in matters of public hygiene, cannot be over-estimated; and it has become a conviction on the part of the Board, that no greater means for developing the work of the Board can be adopted. Hence it is the intention of the Board to hold similar conventions from time to time in such different parts of the Province as time and circumstances may decide as being advisable.

Another document which the exigencies of the season made it imperative to issue was a printed *sheet* with directions to be followed in cases of drowning accidents. A large number of these has been circulated throughout the Province, and placed in the hands of school teachers and others. That a general knowledge of the scientific methods adopted under such circumstances will be instrumental in saving many valuable lives is beyond all dispute.

Another method, which need not be more than mentioned here, as it will be referred to in a later part of this report, is the dissemination of information concerning the prevalence of different diseases in various districts throughout the Province, and of the causes which may seem to be most nearly associated therewith, by means of Weekly Health Bulletins. While the labour in preparing them is very great indeed, it is felt that the benefits to be received by the public at large from such a knowledge cannot be over-estimated.

Another means has been sanitary lectures. This has been carried out principally by the Secretary of the Board, who has, on invitation, delivered lectures in various places under the auspices of Mechanics' Institutes, County Teachers' Associations, etc. That the public are much interested in sanitary matters, the success of these several meetings amply proves; and that this interest is steadily increasing is witnessed in the fact

that a very considerable number of engagements, which, owing to the press of other official duties, have been deferred, are yet to be fulfilled with Institutes in various sections of the country.

4. *The Results of the Dissemination of Sanitary Information.*—As is well known, it is in matters which the general public feel have a direct bearing on their pecuniary well-being, that a hearty interest can be most readily evoked; while objects which have in anyway attached to them a scientific complexion, the general public are too often inclined to think are not for anyone beyond the professional pale. Hence, in matters of import to the public health, there seems to have been in some quarters a half-expressed idea that the people are expected to do something which they may not wish to do, or else that these questions, though they may have some general public application, have no special bearing upon them as individuals. Such feelings, where in any case they may exist, it is the earnest desire of this Board to dissipate. It has endeavoured to make the people understand that the Provincial Board of Health is, *par excellence*, the people's defence against, if we may so express it, external foes in the shape of diseases imported by immigrants or others from foreign lands, and against internal evils; as outbreaks of Scarlatina and Diphtheria, which too frequently lift up their fatal forms in our various communities. That the means, adopted towards such desirable ends by the propagation of information in the ways we have alluded to has been wholly successful, the Board is not vain enough to suppose; but that much ground has been gained, the many communications received for further supplies of pamphlets and the requests for sanitary lectures to be delivered under the auspices of the Board cannot leave any room for doubt. Many Local Boards of Health have been formed during the year; and when these shall have "learnt their limbs," there are the best reasons for hoping that local sanitation will be more extensively carried out.

CHAPTER IV.

*INVESTIGATIONS INTO THE CAUSES OF, AND REMEDIES FOR, VARIOUS
OUTBREAKS OF DISEASE IN THE PROVINCE.*

1. *The Necessity for such Investigations.*—That investigations into the causation of disease have in the past done something towards ameliorating the condition of the human race will, we think, be readily conceded, when we remember that, while in 1700 A.D. the death rate in London was forty in the thousand, and in 1801 it was computed as twenty-six in the thousand, it had in 1875 decreased to twenty-three in the thousand. From this illustration we at once conclude that some causes have been at work tending to lessen human ills, and human mortality. These briefly stated have been the systematic and scientific methods of observing facts in relation to disease, and thence educing inferences as to causes. Up to the beginning of the present century, however, these methods were hardly known—certainly not appreciated. The mistake of the illustrious men of the last century was that they were working too frequently upon false premises. Thus Boërhaave, of Leyden, thought all disease was in the fluids of the system, while Cullen, of Edinburgh, thought it was wholly in the solids. Benjamin Rush, the father of American Medicine, thought that “convulsion of the arteries is the proximate cause of all fevers,” and dogmatically declared that the time would come, “when the general use of calomel, jalap and the lancet shall be considered among the most essential articles of the knowledge and the rights of man.”

Thus it came about that both physicians and laymen became convinced that the physician, by the proper or improper use of drugs, and drugs alone, held in his hands the health of his patient; and in consequence of this the physician was too often looked upon as in some mysterious manner the arbiter between life and death, from whose dictum there could be no appeal.

But as Christison and Bennett succeeded Cullen, as Louis and Andral replaced Broussais in France, and a whole host of experimenters in England, Germany, and America have replaced the irrational methods of the early part of the century, so there has come with them the establishment of what Louis calls the “Modern School of Medical Observation,” in which the enlightened physician looks for the presence of any deleterious agencies or unremoved causes of disease.

Here in a sentence we have given the principles which have come to be the basis of medical science, and which have been but the stepping-stone to what stands out as prominently characteristic of the medical science of the last twenty years, viz., the *investigation* of what these deleterious agencies are. As improved chemical processes and microscopic methods have become so preëminently valuable in such investigations, so with these have developed in equal degree the inductive processes of reasoning from effect to cause, until the whole scientific world is crowded with an army of workers eagerly endeavouring to solve,—and solving,—the comprehensive problems of *biology*. And in connection with these facts we look for the most powerful agencies in the solution of many perplexing problems lying upon the threshold of Preventive Medicine. Given a thorough knowledge of the causes of each of the manifold ills affecting mankind, and a general appreciation of them on the part of the public, then would we have the Archimedean power by which the people would be raised to an infinitely high level of sanitary improvement. But it is in the attaining to this ideal that the difficulty lies. Not only do the people not know, not only do they not appreciate, the minute, yet all potent causes which originate disease, but they cannot bring themselves to comprehend the truth expressed by Dr. Budd when he says, concerning the germs of Typhoid Fever, “It is humiliating to think that issues such as these should be contingent on the powers of an agent so low in the scale of being that the mildew which springs up on decaying wood

must be considered high in comparison." Under such a condition of affairs it must ever be the duty of the true apostle of Preventive Medicine to bring all his energies to bear, not only in propagating among the people at large as much accurate knowledge as may be possible of the known causes which either originate or serve to propagate many diseases, but he must and ought to labour to discover the *causas morborum* of the many ills regarding whose initial steps and the conditions under which they tend to advance, so little is known, understood or appreciated.

Such then is the present condition of medical knowledge on the question of the causation of disease, and such are some of the many reasons which point to the pressing necessity for the Board to extend its investigations in such directions as will be most fruitful in practical results.

2. *The various Investigations undertaken.*—Taken in chronological order they may be referred to separately; or classified, they may be divided into two. As, however, the reports of the various investigations are given separately under Appendix D, it will here prove more convenient, both for the sake of unity and brevity, to classify them.

3. *Investigations into the Causation of Malaria.*—During the past year two applications, the one from Coboconk, in Victoria, and the other from Madoc, in Hastings, were made to the Board, requesting it to send a committee of its members, or some competent person, to examine into the wide-spread prevalence of Intermittent fever in these districts.

A Commission, consisting of Dr. Cassidy and the Secretary, was deputed to make the enquiry. Roughly stated, there were two questions to be solved. The one was whether large accumulations of sawdust, spread over the ground, and along the edge of a river, were the immediate cause, or even the predisposing cause, of an ague which left unaffected scarcely an individual in the village of Coboconk, which is situated for the most part on an island in the Gull River. The other question was whether, in the case of a wide-spread epidemic of a very severe congestive type, in Madoc and vicinity, the immediate, or even the predisposing, cause was to be found in the presence of a wide-spread area of drowned-land extending to the border of the village corporation. It is perfectly clear that here the Committee had no opportunity to avoid grappling with two distinct problems in the causation of malaria. Now it may be said that all this Committee could do was to make use of the ordinary theories as to the causation of malaria, look at the facts, and return home and report with a "yes" or a "no."

For various reasons, however, this would have been unwise and unjust, since in both cases there were material interests involved. Thus it will be seen the scientific principles already enunciated had to be at once brought into use. It would first be necessary to collect as many facts in both cases as possible, and then try to decide how many of these facts might fairly be counted upon as factors in the causation. As a full report of both investigations will be found under Appendix D, we need only cull therefrom such facts as shall tend to elucidate the point at present under notice.

Take the first case, in which the following facts presented themselves to the Commission:—

1. A village situated high and dry on a rocky island between two currents of an originally swift-flowing river.

2. High and dry rocky banks on either side.

3. A dam at the upper end of the island in the left, and another dam at the lower end of the island in the right, channel.

4. A saw-mill on the right bank, with much sawdust distributed along the bank and in the water along the shore for a considerable distance, this mill having been in its present position some four or five years.

5. A complete immunity from ague and fever up to a period one or two years after this mill was built and sawdust had largely accumulated.

6. This immunity is still almost complete in the farm-houses, a few hundred yards back from the river bank.

7. By the height of the lower dam the water of the right stream has been made very sluggish.

Here, it will readily be seen, seems an extremely simple case of cause and effect. Apparently decomposing sawdust, if not the cause, has been at least the *exciting* cause of

the outbreak. But, while the Commission would probably have not been far astray had they stopped at this juncture, and given their ready assent to the opinion so popularly believed and expressed by the inhabitants, scientific principles prevented their doing so. Another fact had to be taken into account. There was, at a point on the right bank, some hundred yards above the saw-mill, a small marsh of several acres in extent, holding at that time but a small amount of water, and largely overgrown with willows, marsh grass and weeds. Now such, when on a large scale, are often notorious as ague-breeding places. Here was a difficulty. But the Committee was in some degree relieved, when it was known that this small marsh had existed for some twenty years previous to the building of the saw-mill, and that little or no malaria had been present in the village. The fact seemed then to be beyond reasonable doubt, that the presence of a large amount of decomposing sawdust was intimately connected with the causation and continued prevalence of the malaria. But, though this was true, it was difficult, if not impossible, to say that, ague once having become endemic in the village, the small marsh was not a factor in its continued propagation.

The Commission deemed it desirable, in connection with this investigation, to have some experiments conducted by a microscopist on the resultants from decomposing sawdust, to ascertain whether or not microscopic ferments in the sawdust were causative of malaria. The results of such experiments were practically negative. As, however, there arise from the decomposing sawdust gases, malodorous and disagreeable, and as its collection under the circumstances is in contravention of the Fishery laws, the Commission advised that action be taken against the mill company for the presence of the sawdust as causing a nuisance, and recommended that it be burnt as fuel or in a kiln.

In the case of the Madoc epidemic, another and larger problem presented itself. The village situated on a basis of Laurentian rock, has a creek passing through it, which has been dammed back, and forms a mill-pond. Like most Canadian villages similarly situated, no system of public drainage has been adopted in Madoc; and, as usual, privies, wells and manure-heaps are too frequently in dangerous proximity, which condition is made all the worse by the fact that the rock, near the surface, makes lateral soakage unusually great, and contamination of wells especially liable to take place. Superadded, or as indeed a distinct question, is the fact that lying south of the village is a large area of swampy lands, extending several miles along the Moira River, which is really drowned land, caused by a damming back of the Moira River at a point some two or three miles below. It is claimed as will be seen in the report, in Appendix D, that this damming back of the river with the consequent drowned land is the exciting cause of the outbreak of fever, which, according to statements taken by the commission, seems to have been of a peculiarly severe type.

As will be seen in this report, there were many facts which had to be considered in their bearing upon the question. But here again, while desirous that if possible some absolute and definite statement be given as to the precise cause of the epidemic, the Commission felt that a positive conclusion could only be arrived at by removing the conditions in the village, which would aggravate any epidemic of disease; and then—should malaria still prevail—would the extensive drowned lands be the self-condemned cause of the potent evil which exists.

With reference to the causation of malaria which is so prevalent in some sections of the Province, much yet requires to be examined into, and in the meantime it seems desirable that some extended action should be taken for the removal of the many causes which are beyond doubt known to favour its prevalence.

The second class of investigations is that concerning the causes of several outbreaks of Typhoid Fever, which have occurred in various parts of the Province. That investigations into the causes of Typhoid have a great practical bearing will readily be conceded, when it is known that the alleged causes are in so many cases capable of removal.

These investigations have been three in number, viz., those of Sarnia, Stratford, and Lambton Mills.

As the reports of each committee of investigation will be found in Appendix D, it will be unnecessary to discuss them in detail; but the points involved may be practically reduced to three in number:

1. Infection conveyed by water-pipes, from the bay water at Sarnia having been contaminated with sewage.

2. Infection conveyed by untrapped house-drains, connecting with sewers containing much decomposing excrement, *vide* Stratford and Sarnia reports.

3. Contagion due to contaminated well-water, as at Stratford and probably Lambton, to the washings from linen of Typhoid patients, and to the excreta therefrom having been thrown into exposed privies without being sufficiently disinfected, the germs therefrom being probably inhaled.

1. Referring to the first point mentioned, the Sarnia Investigation Commission found that Typhoid Fever had been endemic very largely every since the water-pipes for the supply of the town of Sarnia were laid. The main, which is laid out into the bay some 280 feet, is not more than 150 feet away from the point at which the main trunk sewer *debouches* into the bay.

If sewage so deposited, and which, having been slowly moved along through imperfect sewers, has through putrefaction developed its full virulence by the time it has reached the water, is admitted in any case to be causative or provocative of Typhoid Fever, it would appear that every condition is here presented for its full development.

Many interesting points illustrative of the causative influence of contaminated water in the production of Typhoid were brought out in this investigation. Selecting only one, it may be said that one gentleman stated that, living some little distance from that part of the town where the water-pipes were, he paid specially for the laying of a main to his residence. Typhoid, previously unknown in his family, had practically been present in his house ever since the city water had been introduced.

In such a case as this of Sarnia there were in the solution of the difficulty but two courses to pursue, (a) either to prevent the contamination of the water of the bay at the point whence the supply is derived, by the removal of the sewer discharge to some distant point; (b) or, allowing the discharge of sewage to take place as before, to remove the water-supply pipe to some point where the supply is pure. The discussion of the various schemes proposed will be found in the report.

2. The next point, that of contamination of the air of houses by sewer gas being drawn up into them through untrapped drains connected with imperfectly built sewers, is only second in importance to the one already mentioned. That in most towns and many cities the so-called sewers are frequently simply underground cesspools is notorious,—no system either in their construction or in the supply of water having been adopted, by which the sewage will be removed before, through putrefaction, it has developed its poisonous qualities, provocative of disease. It will be most instructive and edifying for those interested to read the evidence taken in both the Sarnia and Stratford investigations on this point. Nothing apparently can be more manifest than that an almost total lack of knowledge exists on the part of the great proportion of our people concerning the dangers surrounding them on every side from such sources. This very ignorance prevents them from adopting means—the services of some competent Sanitary engineer—by which thorough and comprehensive systems of water-supply and sewerage may be established, reducing the death-rate from this cause to a minimum, as may be seen in many cases, such as that of Frankfort where the annual deaths from Typhoid were :

8.5 in 10,000, before good sewerage, in 1856,
2.0 “ “ after “ “ “ 1878.

Are the lives of the six or seven individuals in 10,000 annually lost to each of our towns by ignorance or non-observance of Sanitary laws of no value either in a humanitarian, social or commercial sense, amongst a people who estimate human life in many ways so highly?

These investigations have made prominent, (a) the dangers arising from contaminated well-water, and (b) the probably dangerous effects from careless disposal of the washings of infected linen, and of the excreta in cesspools.

Sewage contamination of well-water on the premises of many dwellings in towns and cities, where privy-pits dug into the soil are placed often not more than 10 or 25 feet

from wells, has become a method so well known to the professional and general public as conveying Typhoid Fever, that it seems marvellous that causes so well known can be longer allowed to exist. If we take the report of the analyst in the case of the Stratford outbreak the dangerous quality of the water is made most apparent.

As is well known most waters contain (in addition to various salts dissolved from the soil) minute amounts of dissolved organic (animal or vegetable matter) materials. Upon such materials myriads of animalcules feed, and minute vegetable forms, *fungi, bacteria, microbes, etc.*, by deriving nourishment from them, aid in their decomposition, especially in the presence of oxygen. Now, it must be apparent that, other things being equal, these minute organisms, *bacteria, microbes, etc.*—many of which, according to the teachings of modern biology, are, when taken into the blood of man or animals, the origin of contagious diseases—will be present in water, etc., in proportion to the amount of organic materials present as food for them. Hence as it is in sewage that the germs of Typhoid especially develop, the reason for water contaminated with sewage being especially dangerous to health cannot but be plain to everyone.

The same reasoning applies to the dangers arising from the washings of clothing containing germs of disease being allowed to evaporate, when these germs may be carried into the air, or they may be carried into the soil and thence into wells with surface water, becoming in either case capable of being received into the system and so carrying on their deadly work.

Facts bearing out these remarks on the causation of Typhoid Fever find ample illustration in the reports already referred to, and show what an absolute necessity there is for extended public action being taken towards the removal of the means by which the spread of such diseases is made possible.

What is aimed at in these investigations.—What has already been stated almost answers the question. Detect, if possible in all cases, the general predisposing cause and the specific causes of these wide-spread epidemics, and then have the people taught them. Sanitation aims directly at prevention, and never can its end be gained until the whole of the body politic have so impressed upon them *what makes disease*, that all their energies shall be aroused to overturn everything tending to cause or extend it. It is the possibility of mistake in the question of causation which leaves room for the numerous opinions which persons with self-interest are ever too eager to promulgate in order to prevent any general public action being energetically taken to remove a public evil.

Besides the direct object aimed at in these investigations, there is another most important end to be gained, and it is, that by publishing the results of these investigations in reports and newspapers throughout the Province, the general public will gradually become so educated that they will be only too ready to adopt such means for removing causes as shall have been proved most beneficial and practicable.

* With the available means of determining the goodness of any water supply no municipality can be excused for the neglect of a plain duty, should it refuse the small expenditure which may be necessary for that object in the case of public water supplies. But there are other cases, and they are the most common ones, where the source of supply is from wells. Contamination of house wells is never necessary. If people want to retain the system of privy-pits, they should, at least, place them at a safe distance from the wells, and have them well lined with water-lime so that their contents may not pass into the wells; but it would be very much better, cleaner and safer if some form of dry-earth system were adopted.

Drains and sewers we can hardly hope will be ever properly constructed until regularly organized Boards of Health have competent engineers and inspectors and strict *plumbing laws*. At present the whole business seems to have a premium laid upon ignorance; while the amount of unpardonable injury to health from such is incalculable.

CHAPTER V.

ACTION TAKEN IN CASES OF OUTBREAKS OF EPIDEMICS, AND OF REPORTED NUISANCES.

Nature of these Epidemics and Nuisances.—It has been already seen that in the case of a number of reported outbreaks of zymotic diseases, investigations have been called for and the Board has undertaken them. But there has been a very considerable number of other cases where it has not been deemed necessary or advisable on the part of the Board to make investigations; but where it has rather been a question of advising action to be taken by the local health authorities, where difficulties have occurred to these in their executive capacity. Other cases again have been nuisances of minor extent, which have been reported to the Board in cases where the local authorities have been either derelict in their duties, or have not deemed the complaint of sufficient moment for action to be taken. We would briefly instance some of these, as out of them arise questions which have a bearing on certain remedial legislation, which the Board would recommend.

Among epidemics of this class not investigated the most serious was one of Smallpox, which occurred at Windsor in the beginning of May. Action on the part of the Board was solicited by the local health authorities, when the Board immediately advised with Dr. Coventry, the Medical Health Officer of the town, concerning measures for the isolation of infected individuals, and for the removal in some cases of patients to the Smallpox Hospital temporarily erected. A conflict between the Health Board and some of the friends of infected persons, concerning their removal to the hospital, which at one time had seemed imminent, was, through the good offices of this Board, prevented; and implicit obedience to the Local Health Board, resulting in the speedy stamping out of the disease, was finally obtained.

A similar case was reported from Ayr, where a villager who had returned from Winnipeg, and had been exposed to smallpox from immigrants, was attacked with the disease. Prompt measures for isolation were also taken in this case, and the disease was speedily exterminated. Too much cannot be said in connection with these cases of Smallpox outbreaks concerning the prophylactic value of vaccination. Where vaccination has been successfully practised, its influence both in limiting the number of cases and the severity of those which may exist, is so great as to place beyond all cavil the propriety of an extension of the existing Vaccination Act, so as to make it embrace the whole Province.

The following statement, taken from an analysis of some five thousand cases occurring in the London Smallpox Hospital is confirmatory of this opinion:—

Thus it is stated: "Let an unvaccinated person contract smallpox and the chances are more than one in three that he dies; let a badly vaccinated person (a person with an imperfect scar), contract smallpox and the chances are not quite one in eight that he dies; let a person with two good vaccine cicatrices have smallpox and his chances of dying are less than one in forty; but persons who have been vaccinated in the best and most complete way will, if they ever get smallpox afterwards, not die of it much more than at the rate of one in two hundred."

The resistance to such an Act—fortunately but little heard of in this highly advanced Province—due to the assertions that such a proceeding is unnatural, that there is a danger of communicating along with it various other diseases, such as scrofula and syphilis, and that an element dangerous to life is being introduced into the system, would seem, in the present position of medical science, hardly to require reference. Though it be true that the introduction of vaccine virus into the system of a delicate or enfeebled child has, in isolated cases, brought about fatal results, we must remember that even

chloroform, with all its beneficent influences, has had its victims; though it is demanded of us "why introduce an element of danger into the system, since on your own admission vaccination does not wholly insure against the attack of Smallpox?" it is sufficient to answer, "look at statistics and see whether the infinitely small risk from vaccination is not compensated for by its protective influence;" and, finally, the operation of the vaccine disease, in this protective influence, is so well understood and worked out by M. Pasteur in his experiments upon the *attenuation*, by cultivation, of the *microbes of chicken cholera*, and of *charbon* or malignant pustule in sheep, that with the added fact that the *vaccine lymph* can now be obtained as *bovine virus*, directly from the establishments where it is taken with every precaution from the healthy cow, opposition to universal vaccination can now proceed only from individuals who, like the opponents of steam engines and railways in former times, oppose because opposition is their profession.

Another event which has occasioned action to be taken on the part of the Board, also arose out of the Smallpox outbreak in Windsor. From a telegram received by the Secretary of the Board on the 22nd of May from the Mayor of Chatham, it appeared that a steamboat excursion was advertised to leave Windsor for Chatham on the 24th of May, and that, as there had so recently been Smallpox in Windsor, a very natural dread took hold of the minds of many persons in Chatham lest it might by this means be conveyed to that town. The incident, although amicably arranged under advice from the Board, is one which is worthy of a brief notice, since it serves to illustrate a deficiency in our existing public health legislation, namely, that there does not exist any authority for preventing the introduction, into a thickly-settled community, of dangerous infectious diseases without the districts in question being first proclaimed by the Lieutenant-Governor in Council, under the provisions of Cap. 190, R. S. O., a proceeding which may tend to create unnecessary alarm. No power is given to the mayor or authorities of any place to prevent the landing of passengers from a supposedly dangerous steamer or other conveyance; but under the Health Act of 1882, sec. 15, power is given to the local health authorities of the place from which such conveyance goes, to prevent its starting. In case, however, the mayor or Health Board of such place refuses to exercise that power, and in case it appears, on information received by the Provincial Board of Health, that the landing of passengers from such conveyance would be dangerous to the public health, the departure of such steamer or conveyance may be prevented by an Order in Council under the seal of the Lieutenant-Governor. In the case referred to the efficient and active Health Officer of Windsor, Mayor Coventry, gave such satisfactory information as to the complete isolation of all cases of Smallpox in that town, and as to the thorough surveillance of all exposed persons, that further action on the part of this Board was not deemed necessary.

As it may not in all cases be possible for such Executive action to be taken by the Government in time to prevent the anticipated mischief, it seems wise to consider whether some more general legislation on the subject would not be advisable.

2. *Immigrant Inspection Service*.—Another subject which may be noticed under this chapter, is that of Immigrant Inspection Service. As the whole matter is reported in Appendix E, corresponding to Chapter V., the Board need not here do more than refer to it. Briefly the matter of immigration inspection may be stated as follows:—

Amongst the thousands of emigrants from the countries of Europe embarking for Canadian or United States ports, there are occasional cases of Smallpox in the incubative stage received on the ocean steamers. These generally pass into the second stage of the disease on shipboard, thus inoculating many others with the virus; and it has frequently happened that interested steamship companies, not being desirous of remaining in quarantine, have managed to suppress the knowledge of the disease being on board; or, as the incubative stage of Smallpox may extend over a period lasting from ten to fourteen days, it may not have appeared on shipboard, and in either case persons who have been exposed to the virus are allowed to travel westward toward their destination, the result being that they either become sick *en route*, communicating the disease to many others in the crowded trains, or, if not along the route, they carry it to be spread in the place of their destination.

Now, it will readily be seen how dangerous such a state of affairs may become to the public health, and how necessary it is that some united, extended and systematic inspection of such immigrants *in transitu* to the west be carried out. As will be seen in the report of the committee, a conference on the subject was held at Port Huron, in May, for the consideration of a scheme of international immigrant inspection. This idea has been supported and acted upon by the National Board of Health of the United States, in conjunction with various railway and steamboat companies and the Boards of several States and cities of the Union. But as yet nothing has been done in the Dominion, unless it be a very imperfect system of quarantine at the ocean ports; while no provision has been made either for the inspection or taking charge of immigrants taken ill *in transitu* to the west, except at Toronto, where an inspection is made under the auspices of the Ontario Government. The intent of such inspection is, however, especially to take charge of immigrants who may be actually suffering from various forms of disease. Under present arrangements it is not natural to suppose that, in the case of patients ill with Smallpox or other contagious diseases, the Government medical officer at this point will assume the responsibility, under the powers at present vested in him, of providing against the spread of such diseases, there being no regular quarantine hospital nor other provisions for that purpose.

This work is clearly one which should be performed by the Dominion Government; and it would seem only proper that a thorough inspection service should be established before the tide of immigration has set in for the coming year, by appointing inspecting officers at various points along all the main lines of travel from the seaboard westward, who, as suggested in the report of the committee, shall board trains at various points, inspect the passengers along the route, and in cases of disease have the patients isolated, the train disinfected, and where the disease is Smallpox, have all unprotected persons vaccinated. It is only by some such system, inaugurated and worked out on an international basis, that there can be prevented the introduction into the Dominion of diseases which may be the causes of epidemics whose extent no one can venture to foretell. The matter has been brought in various ways under the attention of the Dominion Minister of Agriculture, and it is to be hoped that the Federal Government will not delay in taking such general action as shall make unnecessary the quarantine against Canadian trains having infected passengers, which has been threatened by the Health Boards of some western States largely interested in the matter.

3. *Communications regarding Nuisances.*—The following are examples of some of the more important communications received by the Secretary, on which the Board has been invited to take action:—

1. A correspondent wrote stating that a Local Board of Health had been formed in his town, which had undertaken the task of remedying the evils arising from the presence of certain mill ponds, containing much decaying refuse and stagnant water. He further stated that parts of these ponds were situated in an adjoining municipality, and desired to know whether there was any legal machinery by which this municipality might be compelled to take action along with the town for remedying the evil. An answer, pointing out that there is not at present any legislation which would compel such joint action on the part of the contiguous municipality, was forwarded to the clerk by the Secretary of the Board.

2. A correspondent wrote that Diphtheria had been prevalent in his town for months, causing many deaths; that the sanitary condition of the town was very bad; that there were exposed water-closets, bad drainage, bad water, and a stagnant creek in the town; that the corpses of patients dying from the disease had been exposed at public funerals; that the papers of the town had systematically hushed up the matter; and that a Local Health Board was in existence, but had not taken active measures.

3. A village clerk wrote that in the village there are two or three graveyards "crammed" with graves; that wells near by are used; that the soil is sandy and porous, and he fears that drainage from the graveyards into the wells is very common. He advised that further burial in such graveyards should be stopped.

4. A correspondent complained that from lack of sewerage in the city, cellars are flooded and a general unsanitary condition prevails.

Many others of similar import might have been given, but such examples are sufficient to indicate the many and varied questions which have come before the Board. The action of the Secretary in all such cases has been to direct the attention of the municipal authorities of the respective localities to the matter, requesting them, in those cases where such conditions prevailed, to carry out the powers vested in them as Local Boards of Health. In most cases, it may be stated, these powers have been exercised.

Complaints of minor nuisances of various kinds were received by the Secretary, some of them referring to the existence of tanneries in proximity to places of business, to the detriment of the latter as well as of the health of the inmates of such places; complaints from a town Health Officer, of his vain attempts to get judicial action taken in the prosecution of offenders against health by-laws in the cases of non-cleansing of drains, of the unhealthy condition of school-houses, etc.; the opinion of the Board asked for concerning the bearing of the Health Act on the question of establishing a glucose factory in a municipality in defiance of a village by-law prohibiting it; and another somewhat important instance, where several complaints have been made against the nuisances created in different localities near cities by the spreading of night soil, insufficiently deodorized, over land in contiguity with dwellings; others against piggeries in proximity to dwellings, etc.

There is, however, a great difficulty in getting action taken in many instances, owing to the fact of no Local Health Board having been instituted, and no Health Officer having been appointed. Cases of real nuisances existing in municipalities have come under the notice of the Secretary where, owing to members of the council not being personally interested, the difficulty of getting township councils together in the summer season, and then, even if assembled, of obtaining speedy and effective action, strongly point to the necessity of some more definite measures being taken, requiring every municipality, or several adjoining municipalities, to have a Local Health Board, and a Health Officer permanently appointed, one who would possess the confidence of the community, both as to his efficiency and integrity.

CHAPTER VI.

COLLECTION OF STATISTICS OF PREVALENT DISEASES.

The Necessity for such Statistics.—M. Jules Guérin remarks, "That the study of epidemics, submitted as yet to too few regulations and left too much to individual choice, has never rendered the service it is capable of yielding to science and mankind.

"It results from predominance of some great epidemical cause, that all the diseased individualities in the same epidemic have a general and principal resemblance, and exhibit only particular and necessary differences.

"As a consequence of this fact, epidemics become immense centres of observation in which the extent, number, and diversity of the facts, and the variable condition of their manifestations are constantly throwing light upon the most obscure problems of disease."

But, as remarked by Dr. B. W. Richardson, "when we look around at the progress which has been made toward the perfect comprehension of such epidemic disorders, we see no system as yet developed that promises anything like a successful attainment of objects as beneficent as they are great. The majority of observers, indifferent as to causes of disease, are content to rest their exertions on the remedial department of their art, in curing those conditions which ought never to have been permitted."

Further, quoting Dr. Richardson's words: "The study of an epidemic admits of being pursued at two different times: first, when the epidemic is present and is supplying data; second, when it has passed and the data have been supplied.

"I believe, indeed, that half the want of success that has appeared in the study of epidemic diseases has arisen from the fact that by the majority of observers the diseases are only thought worthy of consideration at such times as they may be present. Hence we see, during a serious epidemic visitation, all thoughts aroused and every eye observing; but no sooner has the visitation fled by than, as if wearied outright by the duties of the task, all thought rests and every eye sleeps."

Actuated by the conviction that in the relation of diseases to their causes, and the measures to be taken for the diminishing and uprooting of these very much indeed has yet to be learned and set in action; that, as remarked by Dr. Richardson, very little indeed of systematic extended observation of the conditions present, when epidemics prevail in the community, has been carried on; and that the state of the public health, in its relation to the evil influences of zymotic diseases demands that some extensive, long continued, and correct system be adopted for the registration of the prevalence of the various diseases which so materially increase the mortality within this Province, the Board of Health appointed a committee for the purpose of maturing a plan with this most important object in view.

As will be seen in the report of this committee, as found in Appendix F of this Report, a scheme was proposed embracing the following among its chief features:—

1. A circular was to be sent to a number of medical gentlemen as generally distributed as possible throughout the Province, in which were stated the objects of this scheme, and inviting them to coöperate by undertaking the task of becoming weekly correspondents of the Board, and reporting to its Secretary on printed forms the prevalence of various diseases in their practice. The following is a copy of the circular sent:—

TORONTO, July 17th, 1882.

DEAR DOCTOR,—You may have observed that the Provincial Board of Health, in common with many Boards in the United States, has decided upon publishing a Weekly

Report of disease prevailing in the different parts of the Province, noting, at the same time, the accompanying meteorological and other conditions.

In order to make such reports of any real value in investigating the causes of disease, it will be necessary for the Board to appoint, in various localities, correspondents whose weekly returns may enable it to deduce practical conclusions therefrom.

To this end the Board has addressed this letter to a number of medical practitioners throughout the Province, and it requests you to consider whether you will accept the position of correspondent to the Board from your district.

Leaving out of view the bearing of the proposed work upon questions of Sanitary Science, and looking at it from a purely professional standpoint, the investigations to be made as to the causes and nature of disease will be as important to medical practitioners as many others in which they are engaged and to which they gladly devote more time. The filling up of the blank forms will require only a few minutes each week; and should you be willing to devote that time regularly to it, be kind enough to inform the Secretary at once, so that there may be sent to you stamped forms similar to the one enclosed, and a blotter for your convenience and subsequent reference. Should you decide that you cannot do so, you will confer a favour by informing the Board of some medical practitioner in your locality who, in your opinion, would be willing to undertake the work.

The reports and remarks of correspondents will be treated as confidential, a general average of all the reports being published, and the Board exercising discretion in mentioning the names of particular localities.

Although this work, like that of the Meteorological Reporters in Ontario and of the Disease Reporters in many States of the Union, is done gratuitously, yet this Board trusts that the measure of good accruing from this scheme will be such as to encourage it to expect, in the near future, greater pecuniary facilities for making the reports and the results to be obtained therefrom more nearly perfect.

Trusting that you may find it convenient to co-operate with the Board in this matter,

I have the honour to be, Sir,

Your obedient servant,

P. H. BRYCE,
Secretary.

Of the gentlemen addressed a very considerable number responded, expressing their concurrence in the objects of the Board, and, all but one or two, their willingness to become its correspondents. The Board, finding that its efforts in this direction were readily assented to by so many prominent practitioners throughout the Province, proceeded to prepare the details of the system. These briefly were as follows: The blank form as seen in Appendix F, Article I., was printed, in which are given thirty-nine of the most important diseases known to be present in this Province.

The three columns on the right hand are intended for the insertion, respectively, of the number of diseases actually existing in the practice of the correspondent for the week of which it is a report; of their severity, as indicated by the signs (=), (+), (-), meaning respectively the average, more than the average, or less than the average; and for the degree of prevalence as indicated by the numeral standing in the column "order of prevalence" opposite each disease.

On the opposite page of the form there are ruled columns for the insertion of any prevalent diseases not named in the list given. By the courtesy of the Postmaster-General these forms are allowed to pass as printed matter, thus materially lessening their cost.

The forms having been stamped are sent in conveniently sized packages to the various correspondents, by whom they are filled in on Saturday evening with the cases of the past week, with any additional remarks which the correspondent may deem important, and then having been closed by the counterfoil, are posted to the Secretary of the Board, whose address is printed on the outside. The Secretary then begins to enter the returns, as fast as they are received, in columns similarly ruled, waiting till the last

mail on Wednesday of the week following that for which the Reports are made. It will readily be seen that the immediate value of any report depends upon its being received by the above date. The Secretary has to express his thanks for the prompt returns of his many correspondents, there being rarely more than three or four Reports too late for use.

A circular of instructions was issued by the Board to each correspondent in order to promote uniformity in reporting; and the Secretary takes pleasure in stating that very few defects in this regard have been found.

The reports having been received by the Secretary, the work of collating them has to be proceeded with. This entails a very considerable amount of labour, since their value depends largely upon the degree of accuracy observed in this work. This having been completed the issue of the *Bulletin* is then carried out.

A few remarks may not be out of place as to the methods employed by the Board in collecting the information on which the *Weekly Health Bulletin* is based, and as to the distribution of them; and also as regards the number of the reporters, the relation which the sickness reported by them bears to the total sickness of the Province, the general character of the distribution of this sickness throughout the various districts, the regularity and accuracy of the reports, and the different other points on which their value may be supposed to depend.

The Board could not attempt to collect reports of all the sickness occurring in the Province without expending thereon an undue proportion of the Legislative grant placed at its disposal. It was therefore deemed advisable to adopt such a system as would give regularly, from time to time, fair samples of the nature, character and amount of the diseases existing in the various districts, by selecting places pretty evenly distributed throughout the Province, and by obtaining from them reports regularly furnished by gentlemen engaged in general practice. Although the Board is always very glad to avail itself of the assistance of any gentleman feeling special interest in this work, still it was thought that by thus selecting *places* a more even and general distribution could be obtained than by making a general call for volunteers. A list of such places having been made, the members of the Board, at one of its meetings, suggested the names of gentlemen occurring to them at the time, who they thought would be willing to report regularly, and whose practice is of a general character. It will readily be understood how vacancies in the list of reporters had to be filled from time to time by the Secretary writing and asking gentlemen to undertake the work. So soon as the usefulness of the system shall have impressed itself upon the people, and there shall be a larger amount of money at our disposal for the purpose of collecting and collating a greater number of reports, the Board would desire to obtain, through county and other medical societies, the names of more gentlemen willing to furnish them. At present the average number of reports received weekly is close upon one hundred—a number which compares very favourably with that received by any other Board engaged in similar work.

A careful examination of the map and the various lists and compilations on it, together with the remarks which have been made above as to the selection of localities and as to the character of practice in which the reporters are engaged, will sufficiently indicate the relation which the sickness reported bears to the total general sickness throughout the Province. It may be added that not only are reports received from the central and more populous districts, but the new portions of the Province, such as the Muskoka and Parry Sound districts, and the northern counties in the Ottawa region are all represented, and well represented; and one reporter, with a humanitarian and professional *esprit* worthy of universal imitation, sends in from the far off *Thule* of Prince Arthur's Landing his weekly quota to the scheme of the Board; and though it is not possible to utilize his reports in the *Weekly Bulletin*, still they are very valuable, since they supply data for the more extended study which will be made of the reports as the extent of time for which they are returned increases.

The last point to be noticed here is that of the regularity of the reports received. This too, the Board has much reason to be gratified with. On occasion it may have happened that some correspondent has missed sending his weekly report, but enquiry

has in most cases revealed the fact of his absence from home or personal illness. But the Board takes this opportunity of reminding those interested in the work, that as the possibility of the reports depends upon them, so the value of the deductions therefrom depends upon their regularity and correctness.

What the information is that the report is designed to give, can in part be gathered from the description already given of the blank forms which correspondents fill in. To the best method of utilizing such information the Board gave much thought and careful attention. By some it was thought best to publish weekly reports of diseases of the zymotic class alone. But, while the causes and prevalence of so-called *epidemic or preventable diseases* are undoubtedly the most important end of such reports, it was felt that, inasmuch as there are other diseases of equal or greater prevalence amongst the people, judging from the mortality returns of the Registrar-General's Department, it was most important that the climatic and other conditions coincident with the periods of greatest prevalence of such diseases should, if possible, be registered, and results from them worked out.

Another point to be considered was the frequency with which such reports should be issued. At first, monthly reports were thought advisable, but all points being considered, it was decided to have weekly reports. There were several reasons for this. The first and most potent reason was that the experience of State Boards and City Boards, both in Britain and the United States, has proved weekly returns to be most perfect and the most satisfactory. The reasons for this are not hard to find. The method adopted by many a busy practitioner of medicine in recording cases in his case book is one which while it makes a weekly compilation from it a work of a few minutes every Saturday evening, would make a monthly compilation a work of so much trouble that it would not be so readily undertaken. Again, while in cases where circumstances have made it impossible for the correspondent to make a return for any particular week, there is a certain loss: there would be a much more serious loss were the report of any correspondent for a whole month lacking. But one more reason may be given. In order to interest either the profession or the general public in disease reports, they must be brought before them frequently and in small amounts. The *Bulletin* reports of this Board have been prepared with this object in view.

The method of issuing the weekly report of disease may now be briefly considered.

This too became a subject for serious thought. In addition to the first requisite that the information imparted in such a report be as accurate as possible, it was equally requisite for the accomplishment of the desired end, that it be presented in an attractive form. Hitherto the prime object on the part of other Boards in collecting disease reports has been that of compiling records and working out results in a central office, while there has not been sufficient regard paid to an equally important point, viz.: that of interesting and thereby educating the general public in the bearing of the results derived from these statistics. Hence the method which has hitherto been adopted by most foreign Boards has been to issue in circular form, printed in various ways, the names of a large number of diseases, with figures in closely printed lines, leaving to the reader, in most cases, the task of studying them closely and making his own deductions.

The almost invariable result has been that such information rarely got further than the hands of medical men, and in too many cases these reports have met the doom of much circular literature, and have passed unopened into the waste basket.

But something more has been attempted—and we believe successfully attempted—in the *Weekly Health Bulletin*, published by this Board in the form of a map. Its objects briefly stated are:—

1. To give an accurate report of at least six—the method leaves room for as many more if it be thought advisable—of the most prevalent diseases for the week.

2. A division of the Province into ten districts has been made for purposes of comparison. This division, as stated in the Circular of Explanation issued with the map, is based upon differences in geological formation, and meteorological conditions due to (a) difference in height above the sea level, (b) difference in prevailing winds, (c) difference in rain and snow fall, (d) difference in forest areas, and (e) proximity to large bodies of water, marshes, etc. Thus it will be seen by the map printed in this Report,

for the week ending January 13, 1883, in addition to each of the six diseases most prevalent in each district being shown in its respective place with its per cent. of the total recorded cases for that district, there are diagrams, in which a summing up of the various diseases of all the districts is made, and the comparisons of various diseases may be caught at a glance by him who has once studied the map for a few minutes. It further gives the average of the meteorological conditions prevalent in each district and the important information of its height above the sea level.

3. A briefly printed summary of the information given upon the map and some important inferences drawn from it are given each week.

4. The map serves the purpose of exactly pointing out the extent of each district and the situation of the counties and most important towns of each.

5. It has been a primary object in preparing the report in the form of a map to make it attractive and then instructive; since the very essence of a Provincial Board is to become a public *legislator* in matters pertaining to the public health by previously being a public *educator*.

In this connection the Board cannot but express its gratification, at the favourable manner in which the *Weekly Health Bulletin* has been received by the members of the medical profession, and the public of the Province, as well as by prominent sanitarians in other countries; whilst some hundred correspondents have shown, by the time and trouble they have devoted to the scheme, the interest they have taken in it, and the importance they attach to it.

In the distribution of the Bulletins, the question of expense again enters. Although the cost of them is very little more than of the simple slips issued by other Boards, yet it would, if they were sent regularly, even to all the members of the medical profession, amount to a very considerable sum: it is therefore sent to those upon whose efforts it is based—the regular reporters—and they are asked to place it, when they have perused it, in the post office or some other conspicuous place, where it will be subject to the inspection of the many. It is also sent to hospitals, colleges, and other public institutions; and lastly to any person sufficiently interested to ask for it. Very many individuals have applied to the Secretary for copies of the “*health map*” as it is commonly called. To such an extent has this been the case that the weekly issue has reached a number exceeding 500 copies.

In concluding its remarks regarding “weather and health,” the Board would desire to express its sense of the obligations under which it is to Mr. Charles Carpmael, M.A., F.R.S.A., Superintendent of the Observatory, and to Lieut. A. R. Gordon, R.N., and other gentlemen connected with that institution, for the weekly reports of meteorological conditions they have been so good as to furnish, and which are so valuable to the Board and to all other persons who have made them a subject of study in connection with coexisting diseases.

CHAPTER VII.

THE RELATIONS OF THE BOARD.

In the establishment of a department, whose province and very *raison d'être* it is to undertake the difficult office of preventing the outbreak and spread of disease, a step has been taken, the exact bearing and significance of which are not at once, by a mere casual glance, fully comprehended. It is the recognition of the principle that the State may and ought to exercise a paternal care over the health and lives of the people, not in any fitful or accidental manner, as during epidemics of disease, but in a daily supervision of the habits and manner of living of individuals and communities, in everything that tends to affect favourably or unfavourably the material well-being of the people, to speak of nothing more.

Hence it must be plain that inasmuch as the Government has delegated this power to a Board presumably, from its professional status, competent to advise in all matters pertaining to health, its responsibility is, of necessity, of the highest and most extended nature. Its relations to the people are many and ought to be intimate. As the work of the physician is largely of an individual and personal nature, so must also be that of a Board, which is engaged in a work with the intent of saving individual lives, as a unit in the body politic. But on the other hand, inasmuch as there are numerous problems bearing upon the public health, which have to do with conditions of health external to the Province, with epidemics existing in other lands, and the social and climatic conditions upon which their development depends, it is readily seen how relations must exist between this Province and other countries; between the Provincial Board and other National and State Boards of Health; and that these relations ought to be cordial, close and mutual.

In discussing then, the relations of this Board, we would refer to:—

1st. Relations to the State.—When the State, through its Government, undertakes the execution of any work, it does so with due regard for (a) the necessity and urgency of what is to be done; (b) the means for the carrying out of such work; (c) the difficulties to be overcome, (d) and the benefits accruing from its successful accomplishment. In like manner, when it deposes its work to individuals or to a Board, they are supposed to undertake the work with a full appreciation of the various points which present themselves to the Government or primary administrative authority.

(a) *Regarding the necessity and urgency of the work to be done.*—The report of the various investigations noted in a preceding chapter, and of the large amount of correspondence carried on concerning many health matters, show how much sanitary work there is to be performed. The Board in comparing the local sanitary arrangements existing in this Province with those of States where similar Boards have been in existence for a length of time, recognized the fact that there was great need for extending its operations as far as possible into every municipality of the Province. But this had to be attempted with a due regard for,

(b) *The means for carrying out such work.*—Evidently, as in the case of any Governmental undertaking, this Board was supposed to work with such means at hand as would make such work practicable. The means in this case were, as in every other, first a money grant, and second, sufficient legislation. The first was supplied by a Parliamentary Act, and the second was in a large measure in existence. While in some respects legislation may have appeared insufficient to some, yet, doubtless some regard was borne had for,

(c) *The difficulties to be overcome.*—It may have appeared inadvisable to delegate too much power to any central Board. The difficulties apparently in the way of any such work are of two kinds: the one that of overcoming any jealousy which communities

might feel of what seemed an interference with municipal rights, and the other that of pressing upon municipalities the expenditure to some extent of money for the perfecting of local sanitary organizations, and for the removal, when found necessary, of local unsanitary conditions. However, the Board has found it possible to do much, even under existing laws, and thereby pave the way for greater facilities in this regard.

As already stated the whole of the work has been initiated and undertaken with a view to the benefits accruing from its accomplishment. That something in the way of results has been obtained, the previous chapters of this Report would seem to affirm; but that much—very much—yet remains, must be equally evident from what has been stated. Though some municipalities have in some degree assumed their responsibilities and duties in this regard, yet so much remains to be done in most communities that the Board feels that in this respect its work is hardly more than commenced, and urgently seeks for additional legislation by which its relations with municipal Boards will be more intimate and real.

2. *Relations to Foreign States, and State Boards.*—In various ways it has been shown in previous chapters that health matters are, from their very nature, of so general a character, and the principles underlying them so universal and so generally applicable to mankind under all circumstances and in every climate, that of necessity what in other countries affects the public health must to a large extent influence this Province. Not only is this true, but there are health conditions present in many foreign countries, notably the United States and those European countries with which there is much commercial intercourse, which have direct relations and potent influences upon the health of the people of this Province also. From these relations and influences, whether injurious or otherwise, we cannot escape if we would. In some ways, indeed, the health of countries commercially or geographically close to each other is similar to the meteorological conditions which, prevailing in one country, affect those of some contiguous land. Hence it is that we find that when some general and wide spread epidemic of disease is present either among men or animals in such a country, it very frequently spreads itself to some adjoining one. These being facts acknowledged on every hand, it will be seen that it must be an object of this Board to make its relations with foreign Boards and health authorities close and mutual. Especially must this be the case in all that concerns international inspection of immigrants, and quarantine regulations. The latter would be to a great extent unnecessary if some thorough system in the former matter were adopted. It has already been explained in Chapter V. upon what basis an Immigrant Inspection Service may be made thorough and complete, were all countries concerned to act in concert. But not only in these respects is it desirable that these relations should be intimate, but, in many matters the Province may learn much from the lengthened experience of Boards of Health in Britain and the United States; while in some ways the older lands may learn from the energy and progress of new countries, unfettered by prejudice and tradition. These relations have, we are happy to state, been very generally established by this Board. Through the visits of inspection of its members to Boards in the United States, very complete information has been obtained of the methods of working adopted by these in various States and cities. A large number of very valuable Reports have been received from both Britain and the United States, wherein are found compendia of health enactments and the transactions of other Boards, which will materially assist us in our work. It may also be inferred from our list of exchanges of medical and other magazines, and of various documents obtained from many foreign Boards, that in this way, too, the information received has been largely supplemented.

These relations, then, it will be seen, are of such a nature that it is incumbent upon this Board not only to sustain them but to increase their intimacy.

3. *Relations to Local Boards of Health.*—In the Act of 1882 it is enacted that the Secretary of the Board shall communicate with the Local Boards of Health and Health officers within the Province, and with municipal councils and other public bodies, for the purpose of acquiring or disseminating information concerning the public health; and that he shall also use such means as are practicable to induce municipal councils to appoint Health officers or Local Boards of Health within their municipalities.

Within this clause is contained what this Board feels to be one of the chief duties

which devolve upon it. It is upon the extent, closeness and vitality of this relationship with Local Boards that the real and essential success of this Board as an agent in the direct advancement of the public health must depend.

The means which have been adopted, with the object of making this union complete are various. At the first regular meeting of the Board a circular was drawn up and addressed to clerks of municipalities, asking their coöperation in the objects of the Board, enquiring if they had taken advantage of the powers given them by the Health Act of 1874, to establish Local Boards of Health, and inviting them to report to the Board concerning the sanitary condition of their various municipalities.

We regret to say the replies were not so numerous as they should have been. This seems to have been, in some cases, due to neglect on the part of the clerks to present the documents to the Council. Furthermore, there are numbers of municipalities where Local Boards of Health have a nominal existence, but it has been found that it is just from places where Local Boards are most active that information has been received. That such an undesirable state of affairs should be remedied is evident, and that in every case where occasion has called upon this Board to visit localities, expressions of the same sentiment have been made is equally true. But many causes have combined to produce this result. In most cases we must believe that lack of information as to the real nature of the constitution and work of the Board, and an indifference as to the objects sought, have been the chief reasons why municipalities have not placed themselves in closer and more constant communication with this Board. What is to be done? Educate the people, doubtless; but more than this will be required. As in matters bearing something of a scientific character, it has ever been necessary for the Government to teach and lead the people, so in this. Everywhere it is found that the educated and intelligent members of our communities recognize the necessity for sanitary work, and the wisdom of instituting means for carrying it out. Shall not such opinions prevail?

4. *Relations of the Board to the Medical profession.*—Here and there it has been occasionally remarked that the medical profession does much charity work at present, and that it is not just to ask them to do more, especially for the Government. But in the matter of Disease Reports it may be enough to state some of the reasons why the Board does not deem it wise at the present time to ask the Government to set aside a sum for this purpose.

(1) Assuming that at least one hundred correspondents, at the lowest estimate, are necessary in order that we may obtain correct returns, it would follow that at the rate of one dollar per weekly report, the Government must set apart \$5,200 for this purpose alone; a sum for which the country is not at present prepared.

(2) Again, some have said that by paying correspondents such a sum they would be able not only to report their own practice but that of surrounding practitioners. It is needless to point out to the profession the many difficulties which would prevent medical men in various districts from reporting *uniformly* the cases of their fellow practitioners. And even could it be done, and were such a reporter willing to do this extra work for the pittance proposed, surrounding practitioners would naturally wish a similar sum for their reports, since a discrimination, invidious to them, is at once made.

For these and other reasons the Board trusts that gentlemen proud of their profession, and anxious for its scientific advancement, will continue the work of Disease Reports so auspiciously inaugurated, and which is being so successfully carried out.

It may be remarked, however, that should the time soon come when every municipality shall have its Local Board of Health and Health Officer it may be found possible to make this latter functionary the local receiver of reports from the medical men of his district, to have them summarized by him, and the results forwarded to the Central Office of the Board, there to be collated and have inferences drawn from them.

5. *Relations of the Board to the Public.*—What has been said with reference to the relations of this Board to municipalities applies equally to the public in general, yet inasmuch as the opinions of the individuals of any community, after all form those of its municipal government, it is of the greatest possible importance that the public as individuals should not only know the existence of, but also take an active interest in, the

progress and work of this Board. It has naturally followed that the Board has adopted every means in its power to make known its work and aims, by the wide dissemination through the press of the Province of sanitary information, by the issue of pamphlets and circulars to the clergy, High and Public School teachers, and their Inspectors; by a Sanitary Convention, at which the public were invited to take part in its discussions and deliberations, and by the delivery in a number of places of lectures by members of the Board, and by the Secretary who, by the terms of the Act of 1882, is required, as Chief Health Officer of the Province, to use such means as are practicable to induce municipal councils to appoint Health Officers or Local Boards of Health within their municipalities. That these various means have been an important aid in establishing the close and intimate relations between the Board and the general public, which on every side are growing up, we have every reason to believe; and that these will constantly go on increasing we have no reason to doubt.

If we but glance at the position which the city Boards of Health spoken of in the Report of the Commission to New York, Boston and Albany, hold with reference to the people, we are almost surprised, certainly gratified, to see how gladly and willingly the latter submit to and acquiesce in the measures which these Boards have adopted in the interests of the public. But if we further examine the workings of State Boards, such as those of New York and Michigan, we become aware of how intimately connected with the every-day life of the people are the various enactments and regulations of these Boards. The people, through their representatives, appoint everywhere Local Boards of Health, to whom they look for the guardianship of the public health. But they have gone further in some instances and said that, inasmuch as medical men, by their professional training, are the safest guides in matters of health, on this account their Health officers shall be medical men. Not only this but the people for their own good submit cheerfully to the necessary expenditure. They submit to what some people might call an invasion of individual rights, when, in cases of occurrence of infectious disease, they notify the Health Boards of the presence in their families of such disease, and are placed under various degrees of surveillance, according to the danger of contagion with which it may be attended. They admit that it is a mistaken idea of freedom and independence to suppose that the individual should be allowed to follow his own ideas, no matter how unwise, in such cases; and that such freedom degenerates into license. It is indeed a high development of social science which admits that it is better for the individual to submit to a temporary isolation and supervision, than that the body politic of which he is a member should be injured to an indefinite and unknown degree from its absence. By referring to the report of Dr. C. W. Covernton, Commissioner of this Board to England (to be found in Appendix B), it will be seen that the British mind, although possessed of that sturdy idea of independence epitomized in the remark of Micawber, when, having slammed the door in the face of the bailiff, he exclaimed "Every Englishman's house is his castle," is nevertheless rapidly yielding its adhesion to what is after all but a higher and more extended development of the principle; it is by degrees admitting that every Englishman's town and country is his castle; and that in order to avoid the sad concluding words of the despairing Wilkins, when he ejaculated, "I may say, emphatically, Micawber's a wreck!" it must no longer disregard the laws of public health, but must yield to the utilitarian principle, involved in the fable of "the belly and members," which Menenius Agrippa enunciated as a principle of sociology as long ago as the early days of the Roman Republic, namely, that what is in the highest interests of the State must finally prove good to the individual citizen.

CHAPTER VIII.

WORK TO BE DONE.

In concluding this report of work done by the Board during the past year, having given some account of the varied nature of the work initiated, and considered wherein it has been successfully accomplished, and wherein partially so, it seems natural that some reference should be made to work yet to be done. If we look about us and consider the many varied and diversified agencies, tending to the production of disease and death in any community, and place them all in the category of *work to be done*, we are not only staggered at the herculean task which is before us, but we

“Raise lame hands of faith,”

and, feeling our utter impotence, can find courage only in the thought:—

“Do well your part, therein the duty lies.”

These foes to health are everywhere—in the daily life of the individual, in social life, in commercial and in public life. Immoral and vicious personal habits everywhere abound; false social customs prevail on every hand. Commercial life, with its eager seeking after wealth, causes in too many cases, a disregard for the physical laws which regulate and promote the well being of both body and mind, while public life is in too many cases so surrounded by the conventionalities and traditions which have descended from times when physical laws were very imperfectly understood, that it lays its burdens too frequently upon men who falter and finally fall under their Atlantean loads.

But while sanitary science may and does very properly embrace all these questions, and finds them most properly coming under her *ægis* on their physical side, still, inasmuch as she finds firm allies and workers in these fields, in the pulpit, and on the platform, as well as amongst the people everywhere, she may very well confine her present labours to questions with which she alone can deal.

In alluding to some of the work most urgent and necessary, the Board would refer to:—

1. *The establishment of Local Boards.*—So much on this point has been already incidentally referred to in discussing various matters which have been mentioned in preceding chapters, that but little needs to be added here. Everywhere they are necessary, and this Board will never rest satisfied that its progress is real until it knows that such a Board is existent in every municipality. Such Local Boards must occupy the place, in relation to this Board, not of an army reserve but of the fighting arm of the service. Not only this, but Health Officers of these Boards must be everywhere as sentinels loyal to their cause and efficient in action. Such Boards do exist at present in many places in name, and in some places are active and energetic in promoting health; but how much is required in this direction may be understood from what has already been said. Everywhere their need is admitted, but indifference has hitherto marked too strongly municipal action in this regard. Hence it has seemed to this Board an absolute necessity to recommend such legislation as shall make it incumbent upon every municipality to have, either separately or combined with some neighbouring municipality, its own Local Board of Health, and not only this, but an efficient Health Officer. Britain and many States of the Union have preceded Ontario in this work; but shall it not be that, as this Province takes pride and rejoices in the high status of her educational and other municipal institutions, she shall, having once begun to act in the matter of public health, act thoroughly and efficiently?

2. *Dissemination of Sanitary Information.*—As has been stated already in this Report, the methods adopted toward this end during the past year have been varied and

extended. With a hearty coöperation—in fact with a zealous enthusiasm—a large number of the leading journals of the Province have published, from time to time, articles referring in most complimentary terms to the work of this Board, and to the general subject of sanitary work. Not a dissenting voice has been lifted up against the necessity for improved and advanced methods for promoting the public health; while wherever members of the Board have gone, expressions of hope for the good to be done have been made. In some cases, indeed, there has been disappointment that this Board has so little executive power, municipal Health Boards being too directly dependent upon personal influence to act as they should sometimes do against individual or even class interests.

In addition to the above means of disseminating information, a Sanitary Convention has been held, the proceedings of which were extensively published in the leading journals. More of these conventions are needed, not necessarily carried on by the members of this Board, though they will ever be found willing and anxious to lend aid and countenance to such meetings. No better method than this, which elicits discussion by interesting the public, can be found for disseminating, and giving a practical turn to, sanitary knowledge. The various lectures before referred to have tended in the same direction; while these addresses have been followed by resolutions moved by citizens, in which convictions have been expressed on all hands as to the necessity and value of the work in which the Board is engaged. This work is one which has been little more than begun. Medical men everywhere ought to join in it, and in some cases have done so; while many others doubtless would, were it not for the false idea that educating the public in such a way might be characterized as an unprofessional method of gaining notoriety.

To these methods may be added another which has been carried out very largely during the past year, viz.: that of the dissemination of accurate knowledge on several subjects by means of pamphlets. But however valuable this work may be it is necessarily imperfect. The principle, involved in affirming that such education is necessary, ought to be carried to its legitimate conclusion by having it more generally imparted in our schools.

Although it be true that it would be a most unsanitary procedure to increase the already full list of subjects upon the curricula of our schools, yet it does seem that some method might be adopted by which even comparatively young classes might be taught truths relating to their own health, largely by means of experimental illustrations and charts, of such a nature that it would not require any great mental exertion. Some such idea has already been adopted. It is to be hoped that means may speedily be found for putting it into practice. A larger text-book or manual for the use of students, teachers and the general public is much needed. It ought to be comprehensive, yet concise, and while not technical, yet scientifically correct.

3. *Carrying on of Sanitary Surveys.*—Whatever may have been the original primeval condition of the various portions of Ontario, whether, as in most cases, it has been heavy wood-land, with rivers and streams everywhere, or whether as in certain of the south-western portions it has partaken of a swampy, and in restricted areas, of a prairie, character, it is in both cases equally true that settlement has produced great changes in the surface of the country, affecting the character of the different districts, sometimes favourably and sometimes the reverse. These changes have been effected silently, and generally unnoticed, by the busy pioneer of settlement, and it is by conversation with some old man whose life has been absorbed in this work, that the broad differences between past and present, are brought prominently into view. In nearly every case the listener is informed that before much land was broken up the country was almost free from *malaria*, while others can mark the year when ague appeared along the river bank or valley of some stream, with the damming up of it for milling and lumbering purposes. Again sad memories recall the fatal year in which an epidemic of *Scarlatina* or *Diphtheria* swept over the settlement; but in every case the results only are remembered, while the conditions which aided the spread of such scourges being unknown, have passed unnoticed. Such, in brief, has been the history of every district of the Province; circumstances have produced changes of greater or less extent, everywhere. The forest land in places has been almost denuded; winds sweep over the country

with their violence comparatively unchecked by any wooded territory ; large streams have become greatly reduced in their volume, while towns and villages with their rising manufactories, tending to render impure the waters thus diminished, have everywhere grown up along their course. In other cases the necessities of lumbering have, in the new country, raised the water of almost every stream during certain periods of the year, creating large tracts of drowned land, to be left as pestilential swamps during the later summer months, marked by the abundant decomposition of organic matter.

That such circumstances have produced profound changes everywhere in the climate and local conditions of this Province has, by the labours of scientists, been proven before now from meteorological records.

Such changes in the surface features of the country have for several years past formed a large portion of the extensive investigations undertaken by State Boards of Health in most of the older New England and other States. Year by year something like joint action has been undertaken by several of these States, in which certain districts, especially subject to some form of disease with epidemic characters, have been as minutely surveyed as if it were for the purpose of finding the most eligible line for a railway. From such labours much accurate information is annually being accumulated, and local sanitary improvements are constantly following. Few undertakings would be more likely to benefit the health of the Province, and redound with credit to the practical character of the work of this Board than if some such labours were undertaken under its direction. Surveys are frequently undertaken for the benefit of settlement and the production of provincial wealth : why should further ones not be initiated for the purposes of health, which in every sense is likewise wealth ? By such a system, gradually carried out, an incalculable amount of knowledge would gradually be accumulated upon which municipalities, as circumstances might seem to demand, would undertake and carry out local sanitary improvements. Such a survey would supply accurate information of the unhealthy conditions produced by the obstruction of water-courses, and hence direct attention to the necessity for their gradual removal, and the consequent lessening of their injurious effects ; it would point out the evil results of pollution of rivers and streams, and suggest remedies for abating the nuisances created thereby ; in newer districts it might serve to prevent settlement in what might eventually prove ineligible and unhealthy localities ; and finally in all cases it would serve as an educating medium by which the people being taught to observe the necessity for sanitary precautions, would soon learn the advisability of adopting them.

4. *Sewerage Systems and Water Supply.*—In the development of municipal government under the influence of the progressive tendency of modern civilization in cities, towns and villages, modern improvements and conveniences are among the chief points towards which action is being directed. How readily such improvements are carried out may be seen by comparing what has been done in many towns and cities in Canada, as well as in the United States, with the slow progress which is seen in many Continental countries, hampered as they are with vested rights and traditional conservatism. That utilitarian spirit characteristic of western colonization, is quick to see, and rapid in taking advantage of, whatever seems to be a step in individual and public advancement. Among the chief evidences of this are the establishment of systems of lighting by gas or by electricity, of public drainage, and of public water-supply. Naturally, however, the methods for carrying out these have not always been either thorough or well-advised, inasmuch as all of them are based upon scientific principles, which have not been sufficiently understood by the municipal authorities undertaking them ; or some predominating self-interest has prevented their having been thoroughly executed. This has been especially the case with the systems of sewerage and water-supply which many municipalities have inaugurated. False ideas of public economy have in many cases militated against broad and comprehensive systems in the beginning, resulting very frequently in the condemnation of any system at all. Happily, however, in most cases the cogency of arguments against the utility of such improvements has lost its force, and now many places are most anxious to know the best means for their adoption. These facts have forced upon the Board the prime importance of the dissemination of some concise and definite information upon these difficult subjects.

The Board feels how imperfect at the best can be the information without due regard being at the same time had for the topographical peculiarities of any municipality proposing the adoption of sewerage and water-supply systems. But, inasmuch as the scientific principles, whether they be those of Chemical Physics or Mechanics, underlying all systems are the same, it cannot but serve a most valuable purpose if every municipality be supplied with pamphlets containing information concerning the most approved methods for the disposal of sewage, of the proper materials and shape for sewers, drains, soil-pipes, traps and water-closets, for the size of these various pipes, for their ventilation, and other points in connection therewith. It is likewise most desirable that the attention of such municipalities be called to the absolute necessity there is for attention being paid to the sources of water-supply, if such supply is not going to prove a sanitary evil under the guise of a public convenience. Sewage contamination of public and private water-supplies has proved to be a most fruitful source of disease; and it behooves all to beware lest they fall into Scylla in wishing to avoid Charybdis.

5. *Means for making Sanitary Experiments.*—Whatever progress the practice of sanitary laws has made, whatever position sanitary legislation occupies in the deliberations of parliamentary and municipal assemblies, it must be readily admitted that they are owing to the teachings which have been the outcome of scientific research. Such research has been largely the work of the present century, carried on laboriously and often in the face of the greatest difficulties; but in spite of all we rejoice in thinking that great advances have been made. But while much, very much, has been learned, it is but the earnest of what there is yet to be known.

This being the case, the necessity there is for this Board to take some part in such research must strike everyone who recognizes the work that it is expected to do. It has been given the task of looking into all which pertains to the success and advancement of sanitary measures; and it is moreover expected to speak with authority on such subjects.

6. *Ventilation and Heating of Houses.*—Without entering into any details on this subject (which may be found discussed at length in several of the lectures appended to this Report), it is without doubt true that, while the air-space in our houses is much more than is found in houses in most older countries, it is, through the very general disregard of the supply of any artificial methods of ventilation, much too little; while the necessity for the supply of warmth during the winter months has made artificial methods for preventing the introduction of fresh air into our houses, by preventing the ingress of cold air, very general. That much danger arises from the absence of fresh air is patent to everyone at all acquainted with the injurious results arising from the re-breathed air of rooms, made worse by the presence, in some cases, of gas from untrapped drains. This fact becomes more prominently manifest to the physician in visiting the houses of the poorer classes of citizens, where all these evils are present in aggravated form. To show that even at the present time the fatal effects from such causes are but slowly appreciated or—if appreciated at all—acted upon, it may be stated that in the Dublin Lying-in Hospital, up to the year 1872, the mortality amongst infants within the first fortnight was 1 in every 6 children born; and that upon the adoption of an improved system of ventilation the proportion of deaths was reduced to 1 in every 19½. Again, it may be stated that a century ago, in a London workhouse, while 23 out of every 24 children died within a year of their birth, yet after a parliamentary inquiry into the fact, resulting in an improved system of ventilation being introduced, the proportion of deaths was speedily reduced from 2,600 to 450 annually. In this highly favoured country the apparently large infant mortality would seem to show that there are sanitary defects which need to be inquired into and remedied. Thus the Registrar-General's Report for 1880 shows that out of the 19,802 deaths recorded during that year, 4,379 were of children under one year of age, or that there was 1 death of children under one year of age for every 3½ deaths of all other ages; or if it be compared with the total number of births recorded for the same year, we find that the deaths of children under one year amounted to almost exactly 1 in every 10, and in the ten cities to 1 in every 4 births.

The Board feels that the evils arising from insufficiency of fresh air are of such

magnitude as to make it imperative upon it to use every possible means to educate the people concerning its value. This, in a measure, it has already done in the pamphlet, "How to Check the Spread of Contagious Diseases;" but it has yet more to do in publishing information concerning some of the simplest and best modes to be adopted both for ventilation and heating. Too much cannot be said in directing attention to these measures, not only as prophylactics against disease, but as therapeutic means of prime importance in the successful treatment of it. They are accessible to all; but neglect shows only too conclusively that the absence of sanitary precautions is not so much due to fear of expense, or indifference, as to, in many cases, an utter ignorance of the principles lying at the root of all progress in this regard, and of the dangers arising from the absence of sanitary methods.

But of the extent and character of what remains to be done in the direction of improved sanitation, enough has been said to indicate the nature of the work which the Legislature has placed upon the Provincial Board of Health, established by the Act of 1882. Its creation has laid upon the Legislature establishing it, as well as upon the Board which has undertaken the work, duties which must be performed if what is necessary is to be satisfactorily carried out. This work, so extensive in its nature and so difficult in its execution, will require not only the combined support, but the individual interest, of the legislators. From all that has been said it must be evident that the Board will have many difficulties to meet and overcome. It must expect to meet indifference as to the methods it may employ, from an ignorance, in many cases, of the objects to be accomplished. It may find its measures opposed, in some cases, by the supposed self-interest of individuals; and it need not be surprised if the public should think that sanitary legislation, and regulations for the benefit of the public health, ought in all cases to follow, rather than precede, public opinion. But if the voice of science be unanimous as to the necessity for sanitary measures being taken in the interests of public health; if the more thoughtful and intelligent of the public are one in their opinion as to the desirability of sanitary laws being passed; if foreign States press upon the country the urgency for international quarantine and sanitary regulations for mutual benefit and protection; if statistics from the most civilized States of Europe and America uncontestably prove the incalculable advantages to the State from the annual saving of many lives and of the expenditure of immense sums of unproductive capital in the treatment of disease and burial of the dead; if thousands of homes desolated by the scourge of epidemic diseases, and untold memories, sad and sorrowful at the thought of what might have been had not pale death cast a sable pall over fair hopes blighted and promises unfulfilled, are not to pass unheeded; then can the wisdom be doubted, the urgency questioned, or the necessity denied, of speedy, thorough, and extended measures being taken by the firm, yet not harsh, hands of the men who guide the ship of State in her appointed course towards the desired haven—the people's good? Can there be any doubt that the people of the Province are not only willing but anxious that their representatives on the Provincial Board of Health shall have every facility for teaching, disseminating and adopting sanitary laws "lest," in the words of the motto of the Board, "the people perish from lack of knowledge"—"*Ne pereat populus scientia absente*"?

All which we respectfully submit to your Honor.

WM. OLDRIGHT,
Chairman.

PETER H. BRYCE,
Secretary.

APPENDICES TO THE REPORT

OF

THE SECRETARY

OF THE

PROVINCIAL BOARD OF HEALTH

FOR THE YEAR 1882.

PART II.

[Under Part II. will be found included a detailed account of the proceedings and work done by the Board during the past year. It includes a condensation of minutes of the various meetings, and the reports in full of the various Commissions appointed by the Board for conducting various investigations, and for collecting sanitary information from different sources.]

APPENDIX A.

ARTICLE I.

The following is a copy of the Act establishing the Provincial Board of Health:—

CHAPTER 29 (45 VICT.).

An Act to establish a Provincial Board of Health, and to give increased powers to Local Boards of Health.

HER MAJESTY, by and with the advice and consent of the Legislative Assembly of the Province of Ontario, enacts as follows:—

1. A Board of Health for the Province of Ontario is hereby established, and may be known and called "The Provincial Board of Health of Ontario." It shall consist of not more than seven members, one of whom may be the secretary of the Board. The members thereof shall be appointed by the Lieutenant-Governor in Council. Three members thereof may, upon the constitution of the board, be appointed to hold office for the period of two years, and the other three thereof for a period of three years; subsequent appointments may be for a period of three years, and any retiring member shall be eligible for re-appointment. At least four members of the board shall be duly registered medical practitioners.

Provincial
Board of
Health estab-
lished.

Salaries and allowances of chairman and members of the board.

2. The chairman of the board shall be appointed by the Lieutenant-Governor in Council, and shall be paid an annual salary not exceeding the sum of four hundred dollars per annum. The services of the other members of the board, except the secretary, shall be honorary, and they shall be paid no per diem allowance or compensation, but their travelling and other necessary expenses, while employed on the business of the board, shall be allowed and paid.

Duties of board.

3. The Provincial Board of Health shall take cognizance of the interests of health and life among the people of the Province. They shall especially study the vital statistics of the Province, and shall endeavour to make an intelligent and profitable use of the collected records of deaths and of sickness among the people; they shall make sanitary investigations and inquiries respecting causes of disease, and especially of epidemics; the causes of mortality and the effects of localities, employments, conditions, habits, and other circumstances upon the health of the people; they shall make such suggestions as to the prevention and introduction of contagious and infectious diseases as they shall deem most effective and proper, and as will prevent and limit as far as possible the rise and spread of disease; and they shall, when required or when they deem it best, advise officers of the Government and Local Boards of Health in regard to the public health and as to the means to be adopted to secure the same, and as to location, drainage, water supply, disposal of excreta, heating, and ventilation of any public institution or building.

Information to be published.

4. The board shall from time to time, and especially during the prevalence in any part of the Province of epidemic, endemic or contagious disease, make public distribution of such sanitary literature, and of special practical information relating to the prevention and spread of contagious and infectious diseases through the medium of the public press, and by circular to local boards of health and health officers, Municipal councils, and in and through the public schools and otherwise as shall be deemed by them in the interest of the public health.

Meetings of board.

5. The board shall meet quarterly at Toronto, and at such other places and times as they may deem expedient. Three members of the board shall be a quorum for the transaction of business, and they shall have power to make and adopt rules and by-laws regulating the transaction of its business, and may provide therein for the appointment of committees, to whom they may delegate authority and power for the work committed to them.

Investigation in special cases.

6. The members of the board may, with the approval of the Lieutenant-Governor in Council, send their secretary or any member or members of the board to any part of the Province when deemed necessary to investigate the cause or causes of any special contagious epidemic or endemic diseases, or of mortality; and such investigation may be taken upon oath or otherwise as to the said investigating committee or secretary may appear to be necessary, and in such case the secretary or any member of the board present at the investigation may administer the oath.

Appointment of secretary.

7. The Lieutenant-Governor in Council may appoint a competent and suitable person as secretary of the board, who shall hold office during pleasure, and who may be paid an annual salary not exceeding one thousand dollars per annum, and who shall be the chief health officer of the Province.

Duties of secretary.

8. The secretary shall keep his office at Toronto, and perform the duties prescribed by the Act or required by the board; he shall keep a record of the transactions of the board and shall, so far as practicable, communicate with other Provincial or State Boards of Health, and with the Local Boards of Health, and health officers within the Province, and with Municipal Councils and other public bodies, for the purpose of acquiring or disseminating information concerning the public health; and he shall also use such means as are practicable to induce Municipal Councils to appoint health officers or

Local Boards of Health within their Municipality. He shall also assist in preparing the annual report of the Registrar-General in relation to the vital statistics of the Province, and shall perform such other duties and functions relating to vital statistics and otherwise as may be assigned to him by the Lieutenant-Governor in Council.

9. The board shall keep at all times an adequate supply of vaccine matter for the purpose of supplying at cost price, or upon such other terms as the board may from time to time determine, every legally qualified medical practitioner with such reasonable quantities of the said matter as he from time to time requires.

Board to keep supply of vaccine matter.

10. In the event of a proclamation being issued by the Lieutenant-Governor under the provisions of the ninth or tenth sections of the Act respecting the Public Health (Revised Statutes of Ontario, chapter one hundred and ninety), the Lieutenant-Governor may by proclamation declare the said Provincial Board of Health to have and possess all the powers, rights and authorities conferred upon or vested in the Central Board of Health by the said one hundred and ninetieth chapter of the Revised Statutes of Ontario, and such board shall in such case possess and may exercise in their own name all or any of such powers, rights and authorities in addition to any other powers by this Act conferred.

Lieut.-Gov. may, by proclamation, declare board to have powers of Central Board of Health, under R.S.O., c. 190.

11. The following sections shall be read in connection with, and as part of, "An Act respecting the Public Health," (Revised Statutes of Ontario, chapter one hundred and ninety); and shall be and continue in force whether the proclamation provided for by the ninth section of said last-named Act shall be issued or not.

Following sections to be read as part of R.S.O., c. 190.

12. Every Municipality may establish or erect, and may also maintain, one or more hospitals for the reception of persons having the small-pox or other disease which may be dangerous to the public health; or any two or more Municipalities may join in establishing, erecting, or maintaining the same; but no such hospital shall be erected by one Municipality within the limits of another Municipality without first obtaining the consent of such other Municipality to the proposed erection.

Municipalities may establish hospitals for small-pox patients, etc.

13. When any hospital shall be so established, the physician attending the same, or the sick therein, the nurses, attendants, and all persons who shall approach or come within the limits of the same, and all such furniture and other articles as shall be used or brought there, shall be subject to such regulations as shall be made by the health officers or Local Boards of Health.

Regulation of hospital, sick, etc.

14. When the small-pox, or any other disease dangerous to the public health, shall break out in any Municipality, the health officers or Local Boards of Health, in case the Municipality shall not have provided the same, shall immediately provide such a temporary hospital, or place of reception for the sick and infected, as they shall judge best for their accommodation and the safety of the inhabitants, at the cost of the Municipality; and such hospital, or place of reception, shall be subject to the regulations of the health officers or Local Boards of Health, in the same manner as is hereinbefore provided for an established hospital.

Local Boards of Health to establish hospitals in case of small-pox, etc., if municipality neglects same.

15. When the small-pox, or any other disease dangerous to the public health, is found to exist in any Municipality, the health officers or Local Board of Health shall use all possible care to prevent the spreading of the infection or contagion, and to give public notice of infected places by such means as, in their judgment, shall be most effective for the common safety.

Precautions to be taken to prevent infection.

16. The health officers of any Municipality, or the Local Board of Health, or any committee thereof, may isolate any person having the small-pox or other disease dangerous to the public health, and may cause to be posted up on or near the door of any house or dwelling in which such person is, a notice stating that such disease is within the said house or dwelling.

Isolation of persons having small-pox, etc.

Isolation of persons infected or who have been exposed to infection.

17. When any person coming from abroad, or residing in any Municipality within the Province, shall be infected, or shall lately before have been infected with, or shall have been exposed to the small-pox or other disease dangerous to the public health, the health officers or Local Board of Health of the Municipality, where such persons may be, may make effective provision in the manner which to them shall seem best for the public safety, by removing such person to a separate house or by otherwise isolating him, if it can be done without danger to his health, and by providing nurses and other assistance and necessities for him at his own cost and charge, or the cost of his parents or other person or persons liable for his support, if able to pay the same, otherwise at the cost and charge of the Municipality.

Notice to be given by householder in case of small-pox, etc.

18. Whenever any householder shall know that any person within his family has the small-pox or any other disease dangerous to the public health, he shall immediately give notice thereof to the Local Board of Health, or to the health officers of the Municipality in which he resides.

Notice to be given by physician.

19. Whenever any physician shall know that any person whom he is called upon to visit is infected with the small-pox or any other disease dangerous to the public health, such physician shall immediately give notice thereof to the Local Board of Health or health officers of the Municipality in which such diseased person may be.

Penalty for neglect to give notice.

20. Any person or persons, physician or physicians, to whom the two preceding sections shall apply, who shall refuse or neglect to give the notice by such section required to be given by him or them respectively, shall be subject to the penalties provided by the thirty-second section of "The Act respecting the Public Health," and the said thirty-second section and the subsequent sections of said Act shall apply to any prosecution and proceedings under the said preceding sections.

Payment of salaries and expenses.

21. The expenses of the said Provincial Board and the salaries of the chairman and secretary shall be paid out of such moneys as may, from time to time, be appropriated by the Legislature for that purpose.

Short title.

22. This Act may be cited as "The Public Health Act, 1882."

ARTICLE II.

CONDENSED ABSTRACT OF MINUTES OF THE MEETINGS OF THE PROVINCIAL BOARD OF HEALTH.

FIRST REGULAR MEETING.

OFFICE PROVINCIAL BOARD OF HEALTH,
TORONTO, May 9th, 1882.

The Chairman, Dr. Oldwright, called the meeting to order at 2.30 p.m., by reading the Commission of the Lieutenant-Governor in Council, appointing the following members of the Board: Dr. W. Oldright, M.A., Chairman; Dr. C. W. Covernton; Dr. J. Hall; Dr. J. J. Cassidy; Dr. F. Rae; Dr. H. P. Yeomans, B.A. All of these gentlemen, as well as the Secretary, appointed by a subsequent Order in Council, were present.

Business was begun by the President, reading his address, which, on subsequent motion of Dr. H. P. Yeomans, seconded by Dr. F. Rae, was ordered to be published.

A telegram was thereafter read from Dr. J. Coventry, Mayor of Windsor, asking the advice and aid of the Board towards taking measures for the repression of a small-pox outbreak in that town. Various communications were sent and received from the Mayor, and the Police Magistrate, Mr. Bartlett, concerning the epidemic, owing to the authority of the Local Board in some cases being questioned. The points insisted upon by the Board as urgently necessary, are found expressed in the following letter addressed finally to Dr. Coventry:

TORONTO, May 10th, 1882.

DEAR SIR,—The important point is this, that there shall be no intercommunication between persons outside going at large and any person or thing that has come in contact with the patient after the *eruption* has appeared, and this must necessitate that the patient and those in contact with him shall be kept to themselves either in their own house, whence there shall be no egress either of persons or things; or by being removed to a small-pox hospital. Further, all who have escaped from this quarantine before they have come under the observation of the Medical Health Officer, must be kept under the daily observation of that officer, and be at once *vaccinated* by a medical man, and *isolated* at once if any symptoms of the disease present themselves; or, if they have recently been in contact with the person who is sick with the *eruption*, they must at once be *isolated* for a few days. Everything that has been exposed to infection must be *fumigated*.

I have the honour to be,

Your obedient servant,

PETER H. BRYCE,
Secretary.

The Report of the Commission appointed to visit the Michigan State Board of Health, and to attend the Sanitary Convention at Greenville, was next read by Dr. Cassidy, one of the Commissioners.

Thereafter the Report of the Commission, appointed to investigate an outbreak of Enteric (Typhoid) Fever at Sarnia, was read by Drs. Covernton and Yeomans, the two Commissioners (copy of the Report will be found in Appendix D). After the reception of the Report, it was discussed in Committee of the Whole, and its suggestions adopted on motion of Dr. Rae, seconded by Dr. Cassidy.

The Board then proceeded to appoint a Committee, consisting of Drs. Covernton, Cassidy and the mover, Dr. Rae, to draft and report to it a code of by-laws for its regulation and government. This Committee afterwards reported a code which was received and adopted.

The next item of business, occupying the attention of the Board, was a motion by Dr. Yeomans, seconded by Dr. Rae, and carried: that a circular be drafted and sent to the clerks of municipalities, requesting them to inform the Board whether their respective municipalities have complied with the powers conferred upon them by Cap. 174, section 466 and subsequent sections of the Revised Statutes of Ontario, giving them power to enact by-laws for the preservation of the public health, for the prevention of contagious diseases, etc.

Another circular letter was, on motion, decided to be sent to physicians, along with that to the clerks of municipalities, asking them to use their influence in urging municipal authorities to take action in matters relating to the public health.

It was further moved by Dr. Covernton, seconded by Dr. Cassidy, and carried, that a memorandum be prepared containing a digest of clauses of "the Municipal Institutions' Act" (R.S.O., cap. 174), and of "An Act respecting the Public Health" (R.S.O., Cap. 190), relating to the powers and duties of Local Boards of Health.

On motion of Dr. Rae, seconded by Dr. Yeomans, it was decided that a Committee, consisting of Drs. Covernton, Cassidy and the Chairman, be appointed to consider the best and most economical scheme for obtaining reports of the diseases most prevalent throughout the Province, and that it report at a subsequent meeting.

On motion, the Secretary was instructed to communicate with the health authorities of the Dominion of Canada, and of the several Provinces thereof, and of Municipal and Provincial Boards of Health, where they exist, asking their coöperation in the matter of the proposed "Immigrant Inspection Service."

Exchanges of sanitary literature were directed to be arranged for; and an anemometer and thermometer were ordered to be obtained by the Secretary for the use of the Committee on Ventilation in making experiments.

On motion of Dr. Cassidy, seconded by Dr. Yeomans, and carried, a Committee,

consisting of Drs. Covernton, Hall and the mover, was appointed to discuss measures for the establishment of a Home for Foundlings.

As is required by the Act, the Secretary, on motion, was directed to obtain a supply of vaccine matter, and to keep fresh supplies on hand as required. It was further moved that the Chairman and Secretary be appointed a Committee to enquire into the wisdom of establishing a vaccine farm for keeping permanently on hand a reliable supply of fresh vaccine.

After discussion in Committee of the whole, various Standing Committees were appointed, the following being the Committees :

1. On Epidemic, Endemic and Contagious Diseases, Dr. W. C. Covernton.
2. On Sewerage, Drainage and Water Supply, Dr. W. Oldright.
3. On Adulterations of Food, Drink, etc., Dr. J. Hall.
4. On Heating and Ventilation of Buildings, Dr. J. J. Cassidy.
5. On Vital Statistics and Climatology, Dr. W. C. Covernton.
6. On Poisons, Chemicals and Explosives, Dr. F. Rae.
7. On Schools and Education in Relation to Health, Dr. H. P. Yeomans.
8. On Legislation, Dr. F. Rae.
9. On Finance, Dr. J. Hall.

A motion was carried, moved by Dr. Covernton, seconded by Dr. Yeomans, that municipal authorities be recommended to adopt a by-law concerning the proper disposal of garbage, and the proper materials to be used as foundations for building houses upon.

Upon motion it was decided that a Committee consisting of the Chairman, Dr. Cassidy, and Dr. Rae, be appointed to ascertain whether arrangements could be made for holding a Sanitary Convention at St. Thomas, at such time as might be found convenient.

Before the adjournment of the last session of the first regular meeting, the Secretary was, by a resolution unanimously passed, directed to convey a letter with the following votes of thanks to various gentlemen. Copy of the letter :—

Vote of Thanks.

It was moved by Dr. Yeomans, seconded by Dr. Covernton, and carried : “ That the members of the Provincial Board of Health of Ontario, before separating from their first regular meeting, desire to put on record their grateful sense of fraternal attentions paid to members of their body, who, at the request of the Provincial Secretary, visited Sarnia, by the physicians of that town ; also to the members of the Council and inhabitants for their courteous reception and valuable assistance in the performance of the enquiry especially entrusted to them ; also to Dr. H. B. Baker, Secretary of the State Board of Health, Michigan ; to Mr. John K. Allen and Dr. Nicholson, Secretary's Department, and to the members and officials of the Board ; to the officials of the Detroit Board of Health, to Dr. Jones, Dr. Redmour, and other members and ex-members of the Toledo Board of Health ; to Drs. Stockwell and Northrup, Port Huron ; and to the Mayor, Dr. Sheldon, Dr. Avery, and other citizens of Greenville for the courtesy shown by them to members of this Board during their recent visit to their respective localities.”

The meeting, on motion of Dr. Covernton, seconded by Dr. Yeomans, adjourned to meet again at the call of the Chairman.

WILLIAM OLDRIGHT,
Chairman.

P. H. BRYCE,
Secretary.

First Special Meeting of the Board.

TORONTO, JUNE 6th, 1882.

The meeting was called to order by the Chairman requesting the Secretary to read the minutes of the last meeting. On motion, the minutes were confirmed. The follow-

ing members were present:—Dr. W. Oldright, Chairman; Dr. W. C. Covernton, Dr. J. J. Cassidy, Dr. F. Rae.

Various communications were read.

The Report of the Committee on Disease Reports was thereafter read, and the Board went into Committee of the whole on the Report.

After discussion, the Committee arose and reported progress, and on motion, the Report was received and adopted.

The following motion was then read by Dr. Covernton, seconded by Dr. Cassidy, and carried:—"That in the opinion of this Board it is desirable that a systematic sanitary supervision and inspection of Public Schools be established all over the Province of Ontario. That the Board trusts that the recommendation of so necessary a measure will meet with the approval of every Municipal Council, and that efficiently to carry it out a local health officer be appointed, whose duty in this connection should consist in preventing children who have been suffering from contagious diseases from attending school before the infectious period has passed; in visiting the houses of children absent from school, on account of illness; and in making strict enquiries into the general sanitary condition of the respective families. The mere exclusion of children from school on the occasion of infectious diseases existing in the family is not sufficient. If scarlet fever or any other infectious disease exist amongst ignorant or indigent families, and children from such families are simply excluded from school for a few weeks, when it is known that they have, or are likely to have, it incubating in their system, many opportunities for conveying contagion to school children will still exist. The children from the school may be found mingling with their playmates out of school hours. In order to close against contagion in the way opened by association or by infected clothing, the medical inspector should see that through competent persons contagion should be sought out and destroyed in the house in which it originated."

It was further moved by Dr. Cassidy, seconded by Dr. Covernton, and carried: "That this Board would express the opinion that the appointment of health officers by Municipal Councils should be confined to local medical men, who, from their professional training, are alone qualified to perform the work efficiently. The duties of health officers should include the work of the medical inspection of schools and the supervision of the necessary attention to disinfection in public and private buildings and to the supervision of the families of children suffering from contagious diseases."

After some remarks by Dr. Rae concerning the various measures proposed *re* the Immigrant Inspection Service, followed by some general discussion, the meeting adjourned.

WILLIAM OLDRIGHT,
Chairman.

P. H. BRYCE,
Secretary.

Second Special Meeting.

TORONTO, June 27th, 1882.

The minutes were read and confirmed. The following gentlemen were present:—Dr. W. Oldright, Chairman; Dr. F. Rae; Dr. J. J. Cassidy; Dr. J. Hall.

The Secretary thereafter read various communications, and gave a brief *resumé* of the work carried on by him since the previous meeting.

The Report of the Committee on Sewage and Drainage was read by Dr. Oldright, after which, it was received and adopted.

It was thereafter decided, on motion, that pamphlet No. 4 (How to check Contagious Diseases) be stereotyped as revised; and that municipalities and others be advised by advertisement that such may be obtained at cost from the parliamentary printer.

Dr. F. Rae's report on the Port Huron Convention, and its discussion on Immigrant Inspection, was read and received, and after discussion in Committee of the Whole, was adopted.

A motion made by Dr. J. Hall, and seconded by Dr. J. J. Cassidy, was carried,

to the effect, "That whereas it is the opinion of this Board that contagious diseases frequently originate on shipboard solely from impure air : that it is a matter of great moment for the prevention of such diseases that ships should be constructed with a view to thorough ventilation, that in no case should the hatches be closed without means being provided for the circulation of pure air, and that in the meantime the Government should insist on measures to secure such an end."

The question of the introduction of instruction in Hygiene into schools was introduced by the Chairman for discussion in concurrence with a resolution of the Ontario Medical Association. Its further discussion was postponed.

By motion of Dr. Cassidy, seconded by Dr. Hall and carried, the Chairman and Secretary of the Board were commissioned to proceed to Boston, New York, and Albany, for the purpose of obtaining all possible information concerning the working of the State and City Boards of Health in those places, as well as of making an examination of Vaccine Farms.

It was further resolved that the Board proceed to the selection of correspondents throughout the Province for reporting Diseases to the Board.

After various other items of business, amongst which was the approval of the sheet of "Directions for the Resuscitation of the Apparently Drowned," issued by the Committee on Accidents, the meeting adjourned.

WILLIAM OLDRIGHT,
Chairman.

P. H. BRYCE,
Secretary.

SECOND REGULAR MEETING.

TORONTO, Sept. 5th, 1882.

The following gentlemen were present:—Dr. W. Oldright, Chairman; Dr. H. P. Yeomans, Dr. F. Rae, Dr. J. J. Cassidy.

The Minutes were first read and confirmed.

Various communications were read by the Secretary, and the action taken in each case stated.

The first business for consideration was the details of the proposed Sanitary Convention to be held at St. Thomas.

The next item of business was the reception of the Report of the Commission appointed to investigate the causes of Malaria prevalent in Coboconk and Madoc. It was read in part and received; and on motion of Dr. Rae, seconded by Dr. Yeomans, it was decided to direct the Commission to extend their enquiries as to what action toward its removal the local authorities of these places may find feasible; and likewise to make any experiments in the matter of sawdust, etc., as being factors in the causation of Malaria, and to employ whatever special scientific services they may deem advisable in the pursuit of their investigations.

The methods of reporting to be adopted by the correspondents of the Board in the Disease Reports were discussed along with some minor matters, after which the meeting adjourned.

W. OLDRIGHT,
Chairman.

P. H. BRYCE,
Secretary.

THIRD REGULAR MEETING.

FIRST SESSION.

TORONTO, Thursday, November 30th, 1883.

The Chairman called the meeting to order by requesting the Secretary to call the roll. The following members were present: Dr. W. Oldright, Chairman; Dr. W. C. Covernton, Toronto; Dr. J. J. Cassidy, Toronto; Prof. J. Galbraith, Toronto; Dr. F. Rae, Oshawa; Dr. H. P. Yeomans, Mount Forest. The minutes of the last meeting were then read and confirmed.

Communications on various subjects were read, the principal being from correspondents commending the work of the Board, in issuing such valuable disease reports.

The next order of business, the reading of reports of special committees, was then entered upon, Dr. Rae introducing the Report of the Committee on Legislation. On his motion, seconded by Dr. Covernton, the Board went into Committee of the Whole on the Report.

The discussion of legislation, tending to advance the work of the Board in dealing with questions of public health, was continued throughout the whole session, as well as most of the succeeding session.

SECOND SESSION.

Friday, December 1st, 2 P.M.

The Board met again at 2 p.m. on Friday, a Special Committee on Legislation having sat during the forenoon. The following members were present: Dr. Oldright, Chairman; Dr. Covernton, Dr. Cassidy, Dr. Rae, Dr. Yeomans, Prof. Galbraith.

The minutes having been read, the Board continued in Committee of the Whole the discussion of the Report on Legislation, at the end of which the committee rose, and on motion of Dr. Rae, seconded by Dr. Covernton, the Report was adopted.

Prof. Galbraith, having on motion been added to the Committee on Drainage and Water Supply, Dr. Oldright brought in the Report of the Committee on Sewage and Water Supply, which, after being read, was received and adopted.

The Secretary then read the Report of the Cobocok and Madoc Commission, which was received; discussion upon it being deferred till the next Session.

THIRD SESSION.

FRIDAY, 8 P.M.

The roll having been called the following members were found present: Dr. Oldright, Chairman; Dr. Covernton, Dr. Cassidy, Dr. Yeomans.

A discussion in Committee of the Whole took place on the Report left over, and after rising from committee, the Board adopted the Report as amended. It was thereafter moved by Dr. Oldright, seconded by Dr. Cassidy, and carried: That a copy of this Report be transmitted to the Hon. the Provincial Secretary, with a letter drawing his attention to the recommendations therein contained.

Dr. Cassidy next read a partial Report of the Stratford Commission; the Report was received.

Dr. Covernton thereafter read a lengthy Report of the Commission appointed to collect Sanitary Information in Great Britain and in Europe. After its being read the Report was adopted on motion of Dr. Covernton, seconded by Dr. Yeomans.

FOURTH SESSION.

SATURDAY, December 2nd, 10 a.m.

The meeting was called to order by the Chairman requesting the Secretary to call the roll, the following members being present: Dr. Oldright, Chairman; Dr. Covernton, Dr. Cassidy, Dr. Rae, Dr. Yeomans.

The Stratford Report was read as completed, and on motion of Dr. Cassidy, seconded by Dr. Rae, the received Report was adopted.

A general discussion in Committee of the Whole thereafter took place on the desirability of having instruction in Hygiene regularly imparted in schools, and of having some systematic action on the part of this Board taken for the preparation of a suitable work on the subject.

It was, upon motion, carried : That Drs. Cassidy and Yeomans be a Committee to wait upon the Minister of Education, to ascertain his views on the subject.

Thereafter the following motion was carried :—

Moved by Dr. Oldright, seconded by Dr. Rae : That the Committee on the Disposal of Sewage, etc., be authorized to issue a circular to Municipal Councils and Local Boards of Health, setting forth the evils of the privy-pit and cess-pool systems, and endeavouring to induce them to adopt such systems of disposal of sewage as shall be best adapted to the preservation of health, and the circumstances of their respective Municipalities, and explaining those various methods.

Before adjournment a discussion took place upon the necessity for urging greater stringency in the law respecting public funerals, and certificates of death.

The following motions were, upon motion, carried :—

Moved by Dr. Covernton, seconded by Dr. Cassidy ; That the thanks of the Board be and are hereby tendered to the Right Honourable Dr. Lyon Playfair, Drs. Buchanan, Thorne Thorne, and Sedgwick Saunders ; also, to J. Colmar, Esq., Canadian Government Office, and to the various Health Officers of a large number of cities and towns in Great Britain, for the great assistance they have rendered this Board in supplying them with their valuable Reports and copies of English Statutes relating to the preservation of public health.

And further, it was moved by Dr. Oldright, seconded by Dr. Yeomans : That the cordial thanks of this Board are due to the following gentlemen : Dr. S. H. Durgin, Chairman ; Wm. Davis, Secretary ; and Dr. Richardson, of the City Board of Health, Boston ; Dr. Cutter and J. K. Hodgkins, Esq., of the Chelsea Vaccine Establishment ; and Dr. Stattuck, Acting Secretary of the Massachusetts State Board of Health, for their kind and courteous attention to the Commission of this Board on a visit to the city of Boston ; to Colonel Clarke, Secretary, to Drs. Day, Nagle and Taylor, and to Mr. Collins and other officials of the New York City Board of Health, for the obliging manner in which they lent their aid in giving information to the Commission of this Board, recently visiting the city of New York ; and to Dr. E. Harris, Secretary of the New York State Board of Health, Albany, for his unremitting endeavours to supply your Committee with every information concerning the work of this Department, when recently they visited the city of Albany.

FIFTH SESSION.

SATURDAY, 8 p.m.

The roll being called the following were found present : Dr. W. Oldright, Chairman ; Dr. Covernton, Dr. Cassidy. The minutes of the previous Session having been read, the Secretary read the Report of the Lambton Mills Commission of Investigation into the recent outbreak of Typhoid there. On motion of Dr. Oldright, seconded by Dr. Cassidy, the Report was read and adopted.

Dr. Covernton's Report of the Geneva International Congress of Hygiene was thereafter presented, and on motion of Dr. Covernton, seconded by Dr. Cassidy, the Report was received and adopted.

The two following motions of Dr. Cassidy, seconded by Dr. Covernton, were then read and carried :—

Moved by Dr. Cassidy, seconded by Dr. Covernton : “ Whereas Typhoid fever and Scarlet fever have been clearly traced, both in Europe and America, to the adulteration of the milk with water contaminated with sewage, and in other instances to the washing of the milk-cans with water similarly affected, as well as by direct absorption from the air of germs by the milk ; and, whereas other diseases, such as milk sickness and ulcerative stomatitis, have been traced to the use of milk from cows infected either

with milk sickness or foot and mouth disease, this Board would recommend to Local Boards of Health that a proper inspection of dairies be made in order to prevent the occurrence or continuance of such evils." "That, whereas, several dangerous diseases, anthrax, trichiniasis, etc., may arise from eating the flesh of diseased animals; and, whereas, the stock brought to our large centres are often, from a long detention *in transitu*, entirely unfit to be slaughtered immediately upon their arrival; and, whereas, slaughter houses are often kept in such a way as to impair the health of persons residing near them, it is, in the opinion of this Board, desirable that licensed slaughter houses be established in the vicinity of our cities and towns, and that both they and the animals to be slaughtered be subject to the inspection of the Local Boards of Health and their executive officers."

It was thereafter decided that the President's address at the inaugural meeting of the Board, the various reports presented to the Board, the various papers read before the recent Sanitary Convention at St. Thomas, and two lectures on health subjects recently delivered by the Secretary, under the auspices of the Mechanics' Institute of Galt and the Brant County Teachers' Association, be incorporated in the Secretary's Annual Report. Thereafter the Board adjourned.

W. OLDRIGHT,
Chairman.

P. H. BRYCE,
Secretary.

APPENDIX B.

ARTICLE I.

REPORT OF THE COMMISSION APPOINTED TO OBTAIN SANITARY INFORMATION IN GREAT BRITAIN.

To the Chairman and Members of the Provincial Board of Health.

GENTLEMEN,—I have the honour to report the experience acquired of sanitary laws in operation in Great Britain, as also of the advanced knowledge of Hygiene displayed by the very numerous delegates from all parts of Europe, assembled at the Fourth International Congress of Hygiene, convened at Geneva, on the 4th of September; the session continued until the afternoon of the 9th.

I would *in limine* remark that the position of representative of the Provincial Board of Health, when first spoken of by you, was one that I at first hesitated to assume, as I could not as a sanitarian of but few years' standing presume to be anything but a student before the Gamaliels in the science, that I should find, especially in Great Britain, where Hygiene has been so long diligently studied, and so advantageously practised. I felt on consideration, however, that as I had previously arranged for a visit to England of some little duration, that if you gentlemen considered that I could be of use to the first Provincial Board established in the Dominion of Canada, it was my duty as one of its members to assist, to the best of my ability, the furtherance of the great work of Preventive-Medicine, so judiciously inaugurated by the existing Government.

The performance of the duties assigned was greatly facilitated by introductions kindly furnished me by Sir Alexander Galt to the Right Honourable Dr. Lyon Playfair, Deputy Chairman of the House of Commons; also, to J. Colmar, Esq., Sir A. Galt's deputy in the office of the Canadian Government, at Westminster; and on my arrival in London by a personal introduction from my friend Sir Sidney Waterloo, Member of Parliament for Gravesend, to Dr. Sedgwick Saunders, Medical Officer of Health for the City of London. Through these gentlemen I was favoured with invitations to Drs. Buchanan, Thorne Thorne, and other prominent officers of health, whose spacious and convenient offices are to be found in the palatial new buildings at Whitehall.

Through the kind intervention of these gentlemen I have succeeded in obtaining a large number of English Acts of Parliament on sanitary enforcements, also of literature bearing on the subject. I further obtained from them the names of the health officers of the cities and towns in Great Britain, to whom shortly after my arrival I forwarded copies of the proceedings of our Board since its first meeting and requested them in return to oblige me with their by-laws. In a very great number of instances this solicitation was most courteously and promptly answered, and the large number of reports that I have obtained from the very able officers of health in the various sanitary districts of London, Liverpool, Leeds, Sheffield, Bradford and other cities, cannot, I think, fail to be of great assistance to us in the performance of the arduous and responsible work we are engaged in.

I was prevented by the occupation I had in hand from attending the Sanitary section of the Fiftieth Annual Meeting of the British Medical Association held in the city of Worcester; but, through the kindness of my friend, Dr. Graham, of Toronto, who visited me early in August, a few days before the time fixed, I was enabled to send by him a copy of our Provincial Act relating to Public Health, as also copies of pamphlets circulated generally throughout our Province, and of other work done by the Board, to the Chairman of the Section of Hygiene, Dr. Alfred Carpenter, requesting at the same time for the Ontario Board the favour of any contributions in the science, in which we were co-workers, he might deem useful. To this solicitation Dr. Carpenter sent a message to me by Dr. Graham that he would be most happy to comply. Dr. Carpenter, in his address at the opening of the Section of Public Medicine or Hygiene, reviewed the sanitary work which had been directly performed by the Association since its establishment at Worcester, 1832, where the new campaign for the prevention of disease began, and was made the object of higher significance than the cure.

A large portion of the rapid growth of the Association he attributed to its founder, Sir Charles Hastings, having intimately associated with it inquiries into the causation and prevention of disease, and the application of the principles which regulate the health of the general public. Dr. Ransome, of Owen's College, Manchester, in his address at this meeting, made some remarks so pertinent to the endeavours our Board are making for the procuring of weekly returns of disease from the medical men of the Province, that I cannot refrain from quoting them. These returns, he states, were also utilized by several observers of the influence of atmospheric changes upon disease. They were continued for twenty years, and, in addition to being put to the above purpose, they were found to be of great service in giving timely information of the presence and course of epidemics. They now form a body of medical statistics out of which have been drawn many conclusions respecting the laws of epidemics, their periodic appearances and their causes, and the relations to them of other diseases.

I found on my arrival in England that there was a great dissatisfaction existing in the minds of a large body of practitioners, relative to the Bill now before the House of Commons requiring compulsory notification, by the medical attendant, of infectious diseases. (Copy of proposed Bill to be found in the Birmingham report, page 35.) The arguments employed against this measure may be briefly summarized: That it would be a breach of professional confidence; that the exercise of the powers contemplated in this Bill would lead to the concealment of disease; that dreading the notification which must follow if a medical man were called in, and which might lead to the patients being forcibly removed from their homes to isolated Hospitals, that medical aid would not be summoned, and as a necessary consequence there would be a default of the skilled disinfectant precautions that a medical man would invariably order to be carried out, and thus the infection would be extensively spread; further, that it would degrade the members of a noble profession by forcing on them the position of spies and informers. With such conflicting opinions regarding the best methods to be employed for the checking of epidemic diseases, it may be well to set forth a few facts derived from a return of communications received by the Local Government Board and Home Office, from the local authorities of the several cities and towns in England and Scotland, in which local Acts and By-laws are in force, containing provisions which require the noti-

fication of infectious diseases. I would here state that the compulsory clauses in the proposed new Act, which have given rise to such a tumult of opinion, are practically those embodied if not exactly in the letter, certainly in the spirit of local Acts and By-laws, which for a long time have been in successful operation in England and Scotland. In Greenock this notification clause was introduced in 1876, and Dr. Wallace in his report shews that whereas in the three quinquennial periods before 1876, the death rate varied from 29 to 33.6 per thousand; in the five years, 1876 to 1880, the mortality was only 23.3, and the rate for 1881 was 22. In the five years preceding the introduction of the measure, the annual average of deaths from small-pox was 55, from measles, 50; scarlet fever, 93; typhus, 29; and from enteric fever, 36. But in the following five years, these annual averages were reduced respectively to 28, 13, 28, 12, and 19. Before 1876 Greenock held the unenviable position of pre-eminence among other Scotch towns in the death rate from zymotic diseases. The annual percentage of deaths from these diseases to the total deaths was in that town 27, which rate was only equalled by Dundee; the other towns from Perth to Glasgow varying in their percentages from 21.6 to 25.9; but in the five years 1877 to 1881, the average of Greenock took the lowest place, and was slightly under 14 per cent. In the case of scarlet fever the reduction in the mortality after notification was from an average of something over 5 to an average of less than 1.

In England and Wales these local Acts for compulsory notification have been in operation from periods of time that I now designate: Barrow-in-Furness, 1881; Birkenhead, 1881; Blackburn, 1871; Blackpool, 1879; Bolton, 1877; Bradford, 1881; Burton-on-Trent, 1878; Derby, 1879; Huddersfield, 1880; Jarrow, 1878; Lancaster, 1880; Leicester, 1879; Llandudno, 1879; Manchester, 1881; Norwich, 1879; Nottingham, 1878; Oldham, 1880; Preston, 1880; Reading, 1881; Rotherham, 1879; Stafford, 1880; Staleybridge, 1881. I now append a few communications addressed by the local authorities to the Government Board at Whitehall, giving the results of their experiences. The town clerk of Barrow writes that the compulsory notification of infectious disease by the medical practitioners of the locality, has acted beneficially in regard to the health of the town; two cases of small-pox have been quickly isolated, and the disease did not spread. The local authorities believe that the spread of scarlet and typhoid fevers have been prevented by the Act. The town clerk adds that prior to the Local Act coming in force, the medical practitioners were very reluctant to give any information on the subject of diseases, on the ground that patients generally objected to such cases being made known, and that these same practitioners sought to obtain modifications of the Bill before it became law, but without effect. So satisfied, however, are the local authorities of Barrow as to the great advantages resulting from the Act, that they suggest that the medical men in the surrounding districts should be compelled to give similar information in order to avoid outbreaks, which are often caused by cases imported into Barrow. The town clerk of Blackburn writes to the effect that the immediate notification of infectious disease was the means of preventing the spread of small-pox in the borough when it broke out in April of last year. The town clerk of Blackpool writes: "I think it is the unanimous feeling of the town council that the powers obtained by the Act are most valuable. Personally, I am strongly of opinion that the medical attendant is the proper person to notify the existence of infectious disease to the Medical Officer of Health, and that if it were left to the householder there would be in many cases great difficulty in obtaining the certificate. The town clerk of Bolton reports that since the amended provisions have become law they have been fully carried out, and the corporation has had occasion to institute only one prosecution, the case being that of a medical practitioner who failed to report a dangerous case of small-pox, and was thereupon fined ten pounds. The town clerk of Burton reports that the provisions have been in force for three years, and have proved satisfactory. The town clerk of Derby reports to the same effect. The clerk of the Llandudno commissioners writes: The commissioners are satisfied with the working of the provisions obtained by the Llandudno Improvement Act, so far as these powers apply. The town being a fashionable watering-place, frequented by thousands of visitors during the season, it is of the greatest importance that in this and in similar places, cases of

infectious diseases should be isolated promptly. As the law stands three things have to be obtained, viz: (1st) a medical man's certificate, (2nd) consent of the hospital authorities, (3rd) a Justice's order. To accomplish these time is lost, and publicity given, which necessarily causes alarm. I would take the liberty of suggesting that some simpler method be adopted; for example, if in the opinion of the Medical Officer of Health and the family medical attendant, a case occurs where proper isolation cannot otherwise be obtained, that their certificate of removal be sufficient to accomplish that object. The Medical Officer of Health of Manchester reports: In reply to your letter, dated 3rd April, 1882, respecting the working of the Act for the compulsory notification of infectious disease in Manchester, I beg to inform you that I am perfectly satisfied with it so far. The medical practitioners as a rule have readily complied with the requirements of the Act, and many of them have taken considerable trouble to furnish me with information respecting cases which they have been called upon to attend. Similar testimonials have been received by the Local Government Board from Bradford, Lancaster, Leicester, Norwich, Oldham, Preston, Reading, Rotherham, Stratford, Staleybridge and Warrington.

The following is the form of certificate which, in most of the above cases, the medical man is required to fill up and transmit to the sanitary authorities:—

“Pursuant to the abovementioned Act, I hereby certify and declare that, in my opinion, the undermentioned person is suffering from

Dated the day of 18 .

Name of person suffering from disease,

Situation of the house where such person is,

Name of occupier or other person having the control or charge of the building or room,

(Signed)

of

.”

This certificate must, under a penalty in case of neglect, be forthwith sent by post or otherwise to the Corporation at the Town Hall, addressed to the Medical Officer of Health, and marked outside “Immediate.”

I will now turn to the Public Health Acts, 38th and 39th Vic., Cap. 55, dealing with infectious diseases. By clause 120 and following clauses to 143 included, local authorities are empowered to cause infected premises to be cleansed and disinfected; to destroy or disinfect infected bedding, clothing or other articles; to make provision for the conveyance of infected persons to hospitals or to other places of destination; to obtain magisterial orders for the removal of infected persons, without proper lodgings, to hospitals appointed for the reception of infectious cases; to apply the same provision to shops as to houses; to proceed against persons charged with the exposure of infected persons or things, or letting houses in which persons have been lodging; to provide hospitals and medical attendance for infected persons; to take measures for the stamping out of epidemic diseases; to provide mortuaries. All these various powers may be enforced by penalties varying from a shilling up to five pounds. It would appear that it is open to doubt whether the Act gives power to local authorities to enter on private premises where the infected persons or things are supposed to be lying, as the town clerk of Warrington, where, as I have previously stated, the Public Health Act is strengthened by a local Act containing the provisions recommended by the select committee, writes as follows to the Secretary of the Local Government Board: “I wish particularly to draw your attention to the fact that there is no existing enactment; nor does the present Bill for the better notification of infectious diseases contain any provision, giving a power of entry in private premises to the Medical Officer of Health; without such provisions the Act would be practically valueless. I may, however, add that in this borough the Medical Officer has always demanded and obtained inspection, excepting in one case, where entrance was refused; and I advised—and, I believe, correctly—that an entry could not be forcibly effected.”

I believe I have mentioned that in Great Britain the corporations pay to every registered practitioner for each certificate of infectious disease the sum of half-a-crown in respect of cases in private practice, and one shilling in respect of cases occurring in practice as medical officer to any public body or institution. It might not, perhaps, be deemed out of place for me to record in this report a few of the provisions for dealing with infectious diseases, ordered by the Public Health Act:

1st. Whenever it shall be certified to the Corporation by the Medical Officer of Health or other legally qualified medical practitioner, that the spread of infectious disease is, in the opinion of such Medical Officer of Health or medical practitioner, attributable to the milk supplied by any cow-keeper, purveyor of milk or occupier of a dairy milk store or milk shop, the Corporation may require such individual to furnish to them within a time to be fixed by them, a full and complete list of the names and addresses of all his customers within the Borough, and such cow-keeper or supplier of milk shall furnish such list accordingly after the rate of _____ for every twenty-five names; but no such payment shall exceed _____; and each person who shall wilfully or knowingly offend against this enactment shall for every such offense be liable to a penalty not exceeding five pounds, and to a daily penalty not exceeding five shillings.

I would here call the attention of the Board to the very admirable provisions which the Metropolitan Board of Works consider necessary to be made in all dairies and cow-sheds in the metropolis, for lighting, ventilating, air space, cleansing, drainage and water supply, in compliance with Sections 5 and 6 of "The Dairies, Cow-sheds and Milk Shops Order of July, 1879." See Twenty-fourth Annual Report of Parish of St. Mary, Newington; also reports furnished from the town of Sheffield.

By the careful observance of similar precautions we may guard cities and towns in Canada from epidemics of Typhoid, similar to those that a few years ago prevailed in Marylebone and Islington. In the first instance it was discovered that the milk-cans, before being filled and sent off were washed out with sewage contaminated water, and filth fever was thus distributed far and wide among the inhabitants. In the second instance—that of Islington—polluted water was used to adulterate the milk, and thus scatter broadcast dirt fever. But to return from this digression to the 2nd Provision of the Act:

2nd. When the Corporation are of the opinion, on the certificate of their Medical Officer of Health or of any other legally qualified medical practitioner, that the cleansing and disinfecting of any house or part thereof and of any article therein likely to communicate any infectious disease, or to retain infection would tend to prevent or check infectious diseases, and that such cleansing and disinfection would more effectually be carried out by the Corporation than by the owner or occupier thereof, the Corporation, without requiring such owner or occupier to carry out such cleansing and disinfection as aforesaid, may, if they think fit, but at their own cost, themselves cleanse and disinfect such houses or parts thereof, and articles, and may for that purpose remove any such articles, and shall make compensation to such owners or occupiers for all property or articles destroyed or injured by the exercise of the Provisions of this Section. And any person who shall obstruct any duly authorized officer of the Corporation in carrying out these Provisions, shall be liable to a penalty not exceeding five pounds.

3rd. Every person who shall cease to occupy any house, room, or part of a house, in which any person has within six weeks previously been suffering from any infectious disease, without having such house, room, or part of a house, and all articles therein liable to retain infection, disinfected to the satisfaction of a legally qualified medical practitioner, as testified by a certificate given by him, or without first giving to the owner of such house, room, or part of a house, notice of the previous existence of such disease; and every person ceasing to occupy any house, room, or part of a house, and who on being questioned by the owner thereof, or by any person negotiating for the hire of such house, room, or part of a house, as to the fact of there having been within six weeks previously any person therein suffering from any infectious disease, knowingly makes a false answer to such questions, shall be liable to a penalty not exceeding twenty pounds.

4th. Provision has reference to the period the body of a person dead from infectious disease should remain unburied elsewhere than in a mortuary.

5th. Ordains that in cases of death from infectious disease in any hospital or place of temporary accommodation, the body shall only be removed from such places for the purpose of instant burial.

6th. Relates to penalties to be inflicted on persons who hire or use other than a hearse or public conveyance for the removal of persons dead from infectious diseases, without notifying the owner or driver of the conveyance—other than a hearse—which has been used for the conveyance of the bodies of persons who have so died, and who shall not immediately afterwards adequately provide for the disinfection of such conveyances.

7th. Corporations shall from time to time provide temporary shelter or house accommodation for the members of any family in which any infectious disease has appeared, and who have been compelled to leave their dwellings for the purpose of enabling such dwellings to be disinfected, and shall further provide or contract with any person or persons to provide nurses for attendance on individuals suffering from infectious disease within the Borough, and shall be enabled to charge a reasonable sum for the service of any nurse provided by them.

Sufficient testimony that the opposition to compulsory notification of infectious diseases is very far from universal in Great Britain has been then in the foregoing pages, I think you will judge, sufficiently demonstrated; also, that the most careful and judicious precautions against the spread of contagious diseases have for a long time been observed; for the subservience of this end I would remark on the admirably fitted-up isolation hospitals, an elaborate report on which has been recently issued by Dr. Thorne Thorne, from whom I have received for this Board a copy—a careful perusal of which will convince all that all that money and advanced expert knowledge could accomplish, have in many of the various structures described and illustrated in the report, been most successfully accomplished.

If the name of “isolation hospitals” was exchanged for Sanatoria, it appears to me that a great deal of the prejudice against removal from home of parents, children and other inmates of households would be soon diminished, and before many years cease to exist. There is always more or less associated with the name of hospital, the latent, if not the expressed idea of pauperism; but once let it be generally known that at these Sanatoria, while the comfort, well-being, and medical care of the poor would be most assiduously looked to, there would under the same roof be found accommodations of a nature that even the most fastidious and exacting could take no exception to the disfavour in which by many they are held, would quickly vanish. Of the very superior advantages and diminished death rate in the treatment of these diseases at these isolation hospitals in lieu of their residences, from numerous statistics, I will confine myself to figures to be found in the Fourth Annual Report of the Borough of Derby:—

Total number of cases of scarlet fever from June 1st to October	
7th, 1880	81
Removed from their homes	30
Not removed	51*
Total number of houses, from which the patients were removed .	22
Not removed	45

Of the 30 cases removed and treated at hospital, number of deaths, 1, or 3.3 per cent.; of the 51 cases not removed, number of deaths, 8, or 15.6 per cent.; of the 22 houses from which the cases were removed, there was a spread in 2 of them, or 9 per cent.; of the 45 houses from which the cases were not removed there was a spread of 11, or 26.6 per cent.

Under the 131st Section of the Public Health Act, 1875, of Great Britain, every sanitary authority, whether urban or rural, has the power to provide for the use of the inhabitants of their district, hospitals or temporary places for the reception of infectious

* Five of which were doubtful.

cases of sickness ; and almost universally, whenever an outbreak of contagion occurs, these powers are acted on. In Canada similar powers are conferred by Provincial and Dominion Acts. Let us hope that with such evidences of control as I have just quoted the authorities will not prove slow in availing themselves when necessary of the existing Acts. In Canada from the middle of April to the middle of October, hospital tents with ventilation in the canvas roof, and a boarded floor two or three feet from the ground, would be, in the instances of inability to provide permanent structures, well suited for any exigency.

In order to prevent the extension of infectious diseases, separation should early be established. Any interval allows the cases to multiply and ultimately to become so numerous that attempts at isolation cannot succeed. Prompt isolation on the occasion of cases of small-pox occurring last spring at Windsor, saved the inhabitants from a probably widespread epidemic of the disease, by which numbers of lives might have been sacrificed, and also saved the merchants and shop-keepers from the losses that would have accrued by the interception of all traffic with the neighbouring city of Detroit. We cannot, however, expect in Canada an immediate awakening to the paramount importance of such provisions by sanitary authorities and municipalities, when we find by Dr. Thorne's report that such provision had been made by only 296 out of the 1593 sanitary authorities in England and Wales, and that many of these were not in all particulars equal to the necessity. Dr. Thorne's report is principally occupied with details of sixty-seven of the larger ones visited ; those of Cheltenham and Bradford being on the largest scale. In both instances munificent donations and bequests, as also private subscriptions, had been forthcoming, and therefore they were found in every particular to be equal for the wants they were intended to serve. Dr. Thorne urges the erection of such buildings on sites easily accessible to relatives and friends, so that without trouble or loss of time enquiries may be frequently made as to the patients' welfare. He states that almost every degree of success and failure in securing complete isolation has been met with, but that no hospital adapted to and kept in readiness for the sick was found which had not done some good in preventing the spread of the infection.

It was quite evident from this and other exhaustive reports from local sanitary authorities that I procured whilst in England, that very many things are essential for the complete success of sanatoria or isolation hospitals, which no Acts of Parliament nor local regulations can supply. Not only must the sanitary authorities and health officers perform their several duties, but it must be done in a very gentle and considerate spirit, or the public will withhold that support in the absence of which all compulsory clauses will prove of little avail. The only aim of sanitary authorities is clearly to lessen or remove causes of disease ; and in the performance of the duties required by these authorities, the officers elected must have due regard and sympathy for individual affliction. With this invariably shown, the public will not be slow in recognizing the advantages to be derived from isolation, not only by the patient, but also by the other members of the family and the surrounding neighbourhood.

Before quitting the subject of contagious diseases, there is one recently issued report that I have brought with me upon which I will not venture to offer any opinions of my own, as the subject is many sided, and has not very long ago been discussed in the public prints in Canada as exhaustively as its nature would permit in the lay journals. I refer to the Report of the Select Committee of the House of Commons upon the administration, operation, and effect, of the Contagious Diseases Act. The summary taken from the *London Lancet*, August 19th, extended the enquiry over a period of three years. The subject was divided into two branches by the Committee ; first, the hygienic effects of the Acts ; and secondly, the constitutional, moral and social aspects of their principles and administrations. Under the first head an analysis is given of statistics obtained from the army returns, comparison of results as to disease at the military stations subjected to the Acts, and those unsubjected. The conclusion at which the Committee arrived, as regards the effects of the Acts on the efficiency of the army, is that out of 16.69 per 1000 who would have been withdrawn from the efficient strength of the army in the subjected districts if they had not been under the Acts, 5.38 per 1000 have been *daily*

saved to the efficient strength of the force by the operation of the Acts. To this might be added the gain to the service derived from the increased immunity of the men from the various debilitating and incapacitating disorders which, though not classed as venereal diseases, not unfrequently result therefrom. They conclude by saying that the extent to which the Acts have diminished primary and constitutional syphilis, in the subjected districts appears of itself to your Committee to establish the hygienic utility of the Acts. Under the second head the conclusions arrived at were that the objections were not sustained by the evidence adduced in support of them. One of these appeared so serious that, if it could be proved, it would be fatal to the maintenance of the Acts, "that virtuous women may be, and are brought under their operation." They therefore spared no labour in probing it to the uttermost, with the result that the charges of misconduct brought against the police have broken down—that they are not chargeable with any abuse of their authority, and that they discharged their duties with moderation and caution; that the Acts had been especially useful in diminishing juvenile prostitution, and by the promotion of public order and decency in the subjected districts. After this protracted and careful enquiry they could not recommend the repeal of the Acts; that their repeal would mean the letting loose of increased crowds of abandoned women and girls of all ages upon the streets and thoroughfares swarming with soldiers and sailors, with little or no practical check over their behaviour. They recommend that in some of the unsubjected districts female lock-hospitals should be established; additional powers to be given to the police to enter houses of ill-fame for the purpose of taking steps to diminish prostitution, and also powers to institute proceedings for the prosecution of brothel-keepers, and that police magistrates should have power to grant a search warrant in cases where they have good reason to believe that girls under sixteen are to be found, and to commit for trial any person committing the offence of harbouring them. The Committee do not recommend the extension of the Acts to the United Kingdom generally, apparently from a deference to public opinion; but if the public had the knowledge possessed by the profession of the slow and silent progress of disorganization of internal organs, how lues is the remote cause of disease of brain, of heart, arteries, liver and kidneys; how the sins of the fathers are visited on the children; how many premature and still births, deformities and permanent weakness of constitution; how much tuberculosis and scrofula result, there would surely be a diminished number of people to be found, who deem it almost impious to arrest by legislation its spread.

In the valuable reports that I have brought from the Medical Officers of Health of numerous cities and towns in Great Britain, you will find a general consensus of opinion on the subject of the contagium of Typhoid being developed only from the excreta of patients affected with that disease, and where, either from carelessness or want of knowledge on the part of the attendants, the said excreta were not received in a bed-pan containing either carbolic acid, solution of chloride of zinc or some other disinfectant, and allowed to remain some hours immersed in the same, before being deposited either in latrine or water-closet, and that the soiled sheets, body linen, and coverlets had not been within a short time removed from the bed and immersed in a solution of some one of the disinfectants mentioned. That the contagium is a visible organism, harmless at the time it is excreted, but in a short time, by fermentation or otherwise, multiplying and acquiring a virulent vitality, is everywhere admitted. Where then, from neglect of proper precautions, this vitality has been developed, the germ finds its way into the sewers, drinking water, or milk, and is swallowed or inhaled by a person in whom there is present at the time a receptivity for disease, and enteric fever is developed.

There will be found in Sir John Rose Cormack's paper on the location of special and general hospitals in which contagious diseases are received, the expression of opinions respecting the agency of the winds in wafting pestilence to a considerable distance, in support of which he instances an outbreak of small-pox in the early months of 1879 in a building in the Route de la Revotte, Neuilly, then used as the temporary Hertford British Hospital. Two inmates of distant wards of this hospital, who had never seen any of the cases, had never come in contact with the fomites, or entered the ward in which they were treated, took the disease—one case ending fatally in six days, the other terminating

in recovery. The medium of reception Sir John considers to have been the air. Several times a day they had to pass along a corridor which was cut off from the length of the ward by a partition extending only two-thirds of the height from the floor. Large windows opened from without, directly into this corridor; they were exactly opposite other large windows within the ward, that is to say, at its other end. When these opposite windows were open—which they generally were, more or less—a considerable current of air swept into the corridor from the ward. The two patients mentioned passed through this corridor daily, and in their passage Sir John considers they must have inhaled and swallowed poison-charged epithelial scales, blowing through the ward on their faces. Sir John considers this explanation confirmed by cases in an epidemic of small-pox in Paris related by Trousseau. The case of an extensive spread of an epidemic over Paris of small-pox from an *annexe* of the Hotel Dieu is also brought forward in support of this view; and if on investigation it was found that it was generally entertained by sanitary officers, it would become a question of paramount importance to determine how far isolated hospitals reserved for small-pox cases should be distant from centres of population. Such a concurrence of opinion, however, is far from universal.

I quote first from a speech delivered last year by Dr. Fowler, at a meeting of City of London Union Guardians, in evidence, that small-pox and fever hospitals do not affect the neighbourhoods by radiation. Bartram Lodge is the house nearest to the present Hampstead Hospital, and is used as an orphanage under the superintendence of French Catholic Sisters. There are usually about fifty or sixty young girls in the orphanage, besides many other persons. The distance of the house itself is 107 feet from the nearest hospital pavilion. Now, since the present temporary hospital was opened, 7,352 cases of small-pox and 218 cases of relapsing fever were treated in the various pavilions, but up to the time Dr. Fowler addressed the guardians not a single case of small-pox or relapsing fever occurred in the orphanage. A month afterwards, however, in a footnote to the published speech, Dr. Fowler records two cases. Dr. A. Collie, in a paper published in the transactions of the Society of Medical Officers of Health, entitled, "Some Public Health points in the Management of a Small-Pox Hospital," recommends that a small-pox hospital should be located in places where patients are most likely to be found, that is, in densely crowded parts of large cities, preferring small hospitals to meet the need of local outbreaks, to large hospitals at a distance from the homes of the sick. It should be surrounded by a high wall, at a sufficient distance from inhabited dwellings—the distance open to question. The evidence to decide the point is not so extensive as might be desired; but one existing fact seems to decide the point. The Infirmary of the City of London Union, at Homerton, stands at a distance of ninety-nine feet from the westmost block of the Homerton Fever Hospital, and in this block on two occasions for a period of four months each, there were forty small-pox beds constantly occupied. The windows directly face each other, and are almost always open. Here then are apparently the conditions for the passage of small-pox poison, if it be true that it may be carried at long distances through the air. Amongst a number of persons consisting of children, new born infants and young women in confinement, there were likely to have been some susceptible subjects. The poison was there, and not only in the blocks referred to, but with certain winds it would be likely to be blown from three similar blocks, which are parallel to it. Thus air liable to contamination by about 250 small-pox patients, might on two different occasions for a period of about four months, have passed into rooms inhabited by persons, some of whom were probably susceptible to its influence; and yet on neither of these occasions did a single case of small-pox arise in the Union Infirmary; and although scarlet fever has been treated in the same block for nine years, with the small-pox exceptions referred to, no single case of scarlet fever has arisen in the lying-in wards of the infirmary, or in the children's dormitories. It is on this account that I have come to the conclusion that 100 feet would be a safe distance."

These extracts from Drs. Fowler and Collie would certainly appear to be in direct antagonism to Sir John Rose Cormack's views, as also of the confirmatory views of other experts recently engaged in the investigation of this somewhat obscure question,

and the idea that the material of infection must needs be destroyed by dilution is yet apparently open to question.

Dr. Thorne in his valuable Report, page 42, says: "At the beginning of the present year, statements were made on authority that claimed to be regarded, that occurrences of small-pox in certain parts of London were related to the presence there of the hospitals of the Metropolitan Asylums Board. Under these circumstances the Local Government Board was desirous of getting exact information as to the facts, and desired that medical enquiry into the alleged occurrences should be extended to London. Accordingly Mr. Power was associated in my enquiry for the purpose of investigating with all possible minuteness, such evidence as might be forthcoming from the experience of one of those institutions. The hospital to which Mr. Power's enquiry was directed was that of Fulham, and his report not only confirms the suspicion to which the experiences of Maidstone and Stockton had given rise, but suggests a faculty of extension, under certain circumstances of small-pox to surrounding houses that had not before been recognized."

I would here remark that the minuteness of Mr. Power's investigations, as shown in his report, into everything concerning hospital management in every particular—even to the whereabouts of every person attached to the hospital during every hour of the day, the outgoings of the resident staff and of the non-resident members—were those of a skilled detective, and the results of this minute investigation are the following:—

1. There has been in each epidemic period an excessive incidence of small-pox in houses in the neighbourhood of the hospital, as compared with more distant residences in Chelsea, Fulham and Kensington.

2. The percentage of houses invaded in the neighbourhood of the hospital has become gradually smaller as the distance of the houses from the hospital has increased.

3. Houses on chief lines of intercourse have not suffered more than houses lying in other directions.

4. In point of time there has been a marked relation between the varying use of the hospital, and manifestations of excessive small-pox in the neighbourhood. This was not shown when the hospital was used only for convalescents.

5. Appearance of excessive small-pox in houses around the hospital has never been delayed, until the hospital has become full or nearly full. It has always been most remarkable at the time when admissions to the hospital were beginning to increase rapidly.

6. On comparison of different epidemics, an almost constant ratio is observed between the amount of the hospital operations and degree of excess of small-pox in the neighbourhood.

Here follows an account of administrative circumstances, and the insufficiency of these to account for observed results, page 324:—

7. The machinery of the hospital administration, with inclusion of defects in machinery, does not account for the peculiarity of small-pox incidence within the three parishes of Chelsea, Fulham and Kensington since the establishment of the hospital.

8. That there must have been some condition or conditions operating to produce the observed distribution of small-pox around the hospital that have pertained to the hospital as such, and that have been in excess of the condition of small-pox extension as usually recognized.

Dr. Powers here passes in review the influences of ambulances, visitors to patients and other persons coming and going, conditions of atmosphere external to the hospital that may have been related first to the non-dissemination—and subsequently to the observed dissemination of small-pox around the hospital; that it cannot in the present state of our knowledge be affirmed that, during the period of delay in dissemination, the weather circumstances were such as to account for the delay; but it might be said that, during the period when infection did spread, these circumstances were certainly of a nature to have assisted in the dissemination. Ozone was present just before, was absent during, and reappeared at the end of the period in which sufferers by the outbreak of small-pox became infected. In the last week of December, 1880, and first

days of January, 1881, the weather was first mild or unsettled, and gradually became colder. During the last days of the old year the mean daily temperature averaged 40.6, in following week 38.4; winds steady from south to west, and afterwards to 11th January from north to east.

9. During the present epidemic period, and most probably during former periods, there has arisen in the atmospheric circumstances of the time, peculiar facility for the dissemination, in an undamaged state, of any matter that may have been given off from the hospital.

Such, then, being the conclusions arrived at by this most skilful and patient investigator, it will, I think, be obvious to all that, however desirable it may be from many points of view, isolation hospitals should be within the limits of the city, town or village, that at any rate those set apart for small pox should be located at least a mile or two from suburbs, until further knowledge is acquired of the manner in which particulate contagious matter is disseminated—unless experience should prove that Dr. Wright's idea of flame ventilated hospitals is a safe one.

With regard to the site and construction of isolated hospitals, Dr. Thorne recommends a moderately elevated one, with soil dry, where the free circulation of air around the hospital buildings is not interfered with, and where an abundant and wholesome water supply, together with reasonable facilities for drainage were available. The most efficient hospitals for infectious diseases consist of (1st), an administrative block; (2nd), at least four wards in two separate pairs, in which patients of both sexes suffering from two different infectious fevers can be treated, and (3rd), certain outbuildings, wash-houses, mortuary, etc., etc. He objects both to corrugated iron and wooden buildings, which have occasionally been hurriedly erected to meet with threatened, or existing, epidemics as being too cold in winter, and hot in summer. For the disinfection of clothes, bedding or other articles, he recommends as the best in use, Dr. Ransom's apparatus (See plate No. 27, page 212), which is employed to great advantage in a large number of sanitary districts. A very excellent report on the subject will be found in the St. Matthew Bethnal Green Report for 1881, which you will find at page 28. Dr. Bate, the Medical Officer of the parish, recommends as the latest and best process Mr. Washington Lyons', that of superheated steam.

In the report from the parish of St. Mary, Newington—which, I think, I have before alluded to—will be found some very admirable by-laws, made by the Metropolitan Board of Works on the Management and Building Acts amendment Act, relating to the foundation and sites of buildings, the description and quality of the substances of water, duties of district surveyors, deposit of plans and sections, penalties (page 168), and at page 169, regulations as to dairies, cow-sheds and milk-shops, provisions for the sanitary state of all dairies and cow-sheds, cleansing of the same, as also of milk vessels, contamination of milk, keeping of swine, and registration of dairymen. In the report of the health of the borough of Birmingham you will find (page 45) valuable suggestions for preventing the spread of scarlet fever by patients leaving the hospital, as also a plan of entrance to the undressing room, bath-room, and dressing-room—patient leaving all infected clothes in undressing room, entering nude to bath-room, and in dressing-room putting on clean clothes there left. At page 19 reference will be found to diminution of typhoid, as also of diphtheria, a demonstration of sanitary progress; examination of, and action in regard to suspected diseased and unwholesome food; supervision of common lodging houses, and houses let in lodgings; and at pages 60 to 79, Table IX., results of analyses of water, expressed in parts per 100,000, for every month of the year 1881, both of corporation and well waters.

You will notice in these analyses of the monthly continuance of *corporation* and *well* waters a remarkable illustration of the truth of the frequent remark, that waters may be bright, cool and sparkling, and yet highly dangerous from the presence of the products of decomposing nitrogenous matter, and frequently from the presence of specific germs that may have filtered from neighbouring privies into adjacent wells, showing that the corporation waters averaged only of total solids about 30.28; of ammonia, .002; nitrogen, nitrates and nitrites, .231; total combined nitrogen, .249; sewage or animal contamination, .2010; chlorine, 1.4. The respective figures for the several ingredients in the *well*

waters varied for first from 110.80 to 265.60, for second from 0.10 to 1,800, for third from 4.73 to 9.35, fourth from 4.738 to 9.353, fifth from 470.60 to 932.10, sixth from 6.6 to 21.3; and it will be seen that, notwithstanding these high figures, the well waters are, with scarcely an exception, marked clear, whilst the corporation water as a rule is marked more or less turbid. The evident moral to be derived is, that sight and taste are no guides to purity and wholesomeness of drinking water, and that in large cities the use of well water should be prohibited.

In order to obtain yearly exchanges of Reports from the Honorary Presidents of the different Governments represented at the International Congress assembled at Geneva, I distributed the few remaining pamphlets—showing the work accomplished by our Board since its establishment in March—that I took with me from Toronto; the great bulk, however, I had previously circulated in England, Scotland, and Ireland, receiving in return from many of the Health Officers the Reports I now hand over to the Board. As, however, for the above reason, there were but few to give, I have, since my return, mailed to all those Honorary Presidents of France, Italy, Germany, Spain, Low Countries, Hungary, Sweden, Portugal, Roumania, Servia, Bulgaria, Mexico, Switzerland, Belgium, Brazil, and United States, as also to the most prominent Sanitarians in England, and to Dr. Wakly, editor of the *Lancet*, the most recent issues including the weekly chart. By these means we can I think rely on the receipt of exchanges from all, and thus be supplied with the experience and operations of the numerous Sanitary Boards of Europe.

From two countries only I received, at the time I was in Geneva, Reports, viz., from France and Servia. The Servian Report is translated in two languages—French and German—and, as I had my choice, I selected the one I was familiar with.

Dr. Vladan Georgévitch's Report indicates a far more advanced condition of Sanitary Law than would have been supposed to exist, in view of Servia having been for so many years an integral part of the Turkish Empire, and subsequently for a long period a tributary to the Ottoman Sultan. I translate a few passages from the 19th Article, on "Quarantine and Frontier Posts":—

"The duty of these officers is not to allow any person to enter Servia who is infected with any contagious disease, such as smallpox, exanthematous typhus, scarlatina, diphtheria, etc., etc. If a severe epidemic in a neighbouring country menaces the Principality, the Prince may, on the advice of his Ministers, order an increase of the *personnel* of the frontier posts, and decree the opening of new ones.

"Measures to be taken against smallpox:—The local authorities in the whole extent of the country should take measures for obtaining immediate information of the mildest case of smallpox. Every physician is obliged, immediately after he has diagnosed a case of smallpox in his practice, to acquaint the local authorities without delay. If the case occurs in the place where the physician resides, it is his duty to practice isolation as far as possible; that the house should be interdicted and placarded with a special bill; that the same precautions should be observed with regard to houses containing cases of diphtheria, measles, scarlet fever, and exanthematous typhus. He should also have due regard to the chamber of the patient being supplied with an ample quantity of pure air day and night, winter as well as summer. The patient is to be isolated until after his bath following complete convalescence; vestments and bed linen are to be disinfected; ambulances and carriages employed for transport of sick to be on every occasion after use disinfected." If these regulations are not complied with, pains and penalties are affixed. A law also exists for compelling the vaccination of every infant between the age of three months and twelve months; 2nd, every child, on the termination of the course of the primary schools, is to be vaccinated, and notice of it given in the school certificate; 3rd, every conscript of the permanent army, or of the national militia, as soon as mustered in, is to be vaccinated, whether or not he had been successfully vaccinated in infancy. The expense of vaccination and re-vaccination are not to be fixed by individuals. That of the first vaccination of infants is paid out of the national exchequer, at the rate of forty paras for each successful case. When the vaccination is completed in a district the physician receives a certificate of the number of successful cases, and on this certificate he is paid by the Minister of the Interior. Re-vaccination is to be performed gratuitously.

Other sumptuary laws are given on this subject and a variety of others, such as burials, graveyards, measures to be taken for the prevention and mitigation of venereal diseases. There are very numerous and stringent laws relating to drug-shops, druggists, etc., etc.; also laws of a strict nature regarding hospitals, asylums, schools for medicine, for hospital assistants, also minute ordinances with regard to the introduction of diseased cattle—all displaying the greatest amount of study and forethought, but involving an amount of passive obedience and non-resistance that, as a rule, the Anglo-Saxon race would not willingly yield implicit obedience to until at least they had become convinced that only by such means could any hope be entertained that the spread of infectious diseases might be controlled.

To the accomplishment of so desirable an end the labours of this Board are directed, and although most probably for some time we may have to recognize the wisdom of the axiom, "*Festina lente*," our duty is plain: to endeavour perseveringly to educate the people into a willingness to abandon long-conceived prejudices, not only by such means as have been employed since our first inauguration, but also by the frequent publication in the journals of the Province of excerpts from American and European Reports from Government Boards of Health.

When in England I was frequently told that the sanitary procedures ordained and carried out by many of the State Boards in America were altogether in advance of those precautions that they approved of but did not feel, in the present state of sentiment there existing, at liberty to recommend. I allude particularly to the placarding of houses where infectious disease is present, but where, from existing circumstances, more complete and satisfactory isolation could not be practised. Similar difficulties, I apprehend, may be for a time experienced in our Province, unless the situation of the town where an epidemic threatened is so closely adjacent to the frontier as to enlist the coöperation of our American cousins. In that case the pecuniary loss incidental to the enforcement of quarantine regulations would be a powerful argument against a mere sentimental objection. We have, however, more formidable lions in our path than mere sentimental objections, viz., class interests.

Difficulties and prejudices to be encountered cannot, however, deter this Board from the prosecution of the great work commenced; rather will they serve as a spur to renewed effort, and to the enrolling on its banners the words of the late Canon Kingsley: "Let our hearts be bowed as the heart of one man, to say, that so far as we have the power, so help us God, no man, woman or child, be he prince or be he beggar, shall die henceforth of disease capable by human means of prevention."

C. W. COVERNTON,
Commissioner.

DOCUMENTS OBTAINED FOR THE BOARD BY DR. COVERNTON, COMMISSIONER TO
GREAT BRITAIN.

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Annual Report Borough of Derby, 1880.

Borough of Bradford Report, 1880.

Contribution à la Géographie Médicale Stockholm, 1881.

Census 1881, Glasgow—as a basis for the statistics.

Report of Health Sanitary Condition of Newcastle-upon-Tyne, 1880.

Tenth Annual Report of Local Government Board, 1880-1881.

Report from Select Committee on Police and Sanitary Regulations.

Journal of the Society of Arts, 1875.

Dr. Thorne's Report on Outbreak Scarlet Fever at Home for Girls, Barkingside, March 3rd, 1880.

Dr. Parson's Report on Outbreak of Diphtheria in the Sutton-in-Ashfield Urban Sanitary District, 56th June, 1882.

General Order Urban Sanitary Authorities.

An Act to amend the Law relating to Public Health, 7th August, 1866.

An Act to amend Public Health Act, 1848.

An Act Vesting Powers in Privy Council for Protection of the Public Health.

General Order—Port Sanitary Authorities' Regulations with respect to Medical Officers of Health.

Water Analysis.

Memoranda and Tables, Returns of Deaths, and Returns of Pauper Sickness.

Memorandum on the Duties of Sanitary Authorities *re* Epidemics and Smallpox.

Reports on Outbreak of Enteric Fever.

Reports of Medical Inspectors on General Sanitary Conditions of Certain Places.

Papers concerning Provisions regarding Epidemics and Contagious Diseases.

ARTICLE II.

REPORT OF THE COMMISSION APPOINTED TO VISIT BOARDS OF HEALTH IN BOSTON, NEW YORK, AND ALBANY.

To the Members of the Provincial Board of Health:

GENTLEMEN:—In obedience to the commission of the Honourable, the Provincial Secretary, given in accordance with a motion passed at the Second Special Meeting of the Board, your Committee proceeded to Boston, New York, and Albany to enquire into the details and modes of working of the various Boards of Health of those places.

As the details of the various City Boards are in many ways similar, as are also those of the various State Boards, your Committee have not thought it necessary to detail in order the working of all the Boards, but to point out the essential details of their work, noting any differences which may mark individual Boards.

Your Committee having placed themselves in communication with the various Boards as to their intentions, cordial invitations were received from them, and thus armed your Committee proceeded first to Boston, where they called at the office of the Secretary of the Massachusetts State Board, but unfortunately found that gentleman H. P. Walcott, Esq., M.D., absent, his place being taken temporarily by Dr. Shattuck, who was out of the city at the time, but was expected to return the following day. This gentleman did your Committee the honour of calling upon them, and, having appointed to meet them at his office, showed them the methods of working as at present carried on by that Board. Nothing of great importance was here obtained, however, the chief executive officer being absent, and the Board having undergone within the last two or three years several changes through political causes, which have seriously affected both its organization and usefulness.

This is due to there being attached to the same Department the work of the State Board of Lunacy and Charity, a combination which has limited the operations of the Board of Health proper, and has impaired greatly the efficiency of its own proper work, reducing its work to practical matters relating to public nuisances, such as the pollution of streams and rivers—a work imperatively necessary in a State so largely engaged in manufactures.

Other work, however, such as the publication of weekly mortality statistics from reports from various cities of the United States, legislation for the restriction and prevention of smallpox, and investigations into the nature and causes of malarial diseases, which of recent years have much increased in area in the Eastern States, is still carried on.

Having next called upon the officials of the Board of Health of the city of Boston, your Committee were most courteously received, and through their polite attentions obtained a large amount of information. Before referring to this your Committee would take this opportunity of expressing their appreciation of the kindness shown by Dr. S. H. Durgin, Chairman, Dr. Richardson and the Secretary, Mr. Davis, in explaining to them the details of their particular work.

The composition of the Board is as follows:—A physician as Chairman, a lawyer and a layman.

The staff of Executive Officers in addition consists of:—

1. One or more city physicians with duties of vaccinating, visiting poor districts, etc.
2. A medical quarantine officer.
3. A Secretary.
4. A disinfecting corps.
5. A Superintendent of Health, who has under his control some 700 men, employed in the extensive work of scavenging, granting licenses for various businesses, etc.
6. Inspectors of wards or sections.

The members of the Board are appointed biennially or triennially by the nomination of the Mayor, which nomination has to be confirmed by the Aldermen and Councillors.

Various occupations are licensed and controlled by the Board, under the direction of the City Superintendent of Health. The nature of subjects coming under the notice and action of the Board will be indicated by an enumeration of the blank forms in use by it, copies of which have been handed to your Committee :—

1. License to remove manure.
2. License to sell fish.
3. Directions against depositing fish, refuse, etc.
4. Directions for people storing hides, so as to prevent nuisance.
5. Forms directing that horses affected with glanders must be killed.
6. Forms of licences given to soap-men, etc.
7. Form of agreement to pay for drainage of premises by the Corporation.
8. Forms to be filled in by Inspectors of Schools.
9. Forms directing against the depositing of salt on sidewalks.
10. Copy of quarantine regulations, controlled by the city.
11. Circulars with precautions against diphtheria and scarlatina, and for preventing the scholars of an infected family going to school.

Some of the principal duties with which the Board concerns itself are the following :

1. The extensive work of preventing and abating nuisances in a city of 400,000 inhabitants is to be noted. The arrangements for effecting this are apparently very complete and thoroughly carried out.

The city is divided into 25 wards, comprised in 11 sections, with Inspectors with special duties in each. When a nuisance is present in any locality, complaint being made in writing to the Secretary, he immediately places a filled up slip in one of the two boxes, in the offices, set apart for the Inspector of the district where such nuisance occurs requesting him to make an immediate examination of the premises. After examination, the Inspector places his filled up report in box No. 2. The Secretary thereafter examines it and takes action in accordance therewith. If it be reported on as constituting a nuisance the Secretary sends a first warning to the owner, or occupier of the premises, to have it immediately removed. The Inspector again visits the premises to see that the notice has been obeyed. If not, a second warning, and if necessary, a third and final is sent, stating that if not remedied in a certain number of days the premises will be forcibly vacated. This final remedy is not often necessary, only 25 evictions having occurred during the last year.

This process shows how thorough in their operation and absolute in power are the laws which this Board enforces.

By this system too, every house in the city may sooner or later come under the notice of the Board, and since all inspections made are registered a complete knowledge of every house in the city may be obtained.

During the last year it may be stated that 8,086 nuisances were abated on complaint to the Board.

2. The next important duty of the Board is the prevention of the spread of contagious diseases. Here a compulsory system of notification of infectious diseases is adopted. Whenever such information is received at the office of the Board, one of the city physicians immediately visits the house and sees that every precaution is being taken for the isolation of the patient. But, further than this, a minute inspection of the premises is made with the object of discovering, and remedying unsanitary conditions ; and where such are found to exist, the owner or occupant is immediately ordered to remedy them. Thus, in the case of diphtheria, the result of the examinations during the past year revealed the fact that with a total of 1,704 cases, 601 of which were fatal, it was found that 1,342 occurred on premises where the drainage was defective, and only 235 where the premises were in good sanitary condition, at least defects were not noticed.

Where the precautions taken by the family or their physician were imperfect fumigation was undertaken by the officers of the Board. There were 316 such cases during the past year.

The sewerage of the city was examined into, when your Committee found that the Boston Board had urged, and had been successful in getting action taken in the matter of an intercepting sewer along the water front of the city. Its estimated cost when completed will be some \$6,000,000.00, and will then have been some eleven years in progress. Your Committee also found that a systematic examination of house-drainage is being carried on by the Board, with the ultimate aim of having a complete knowledge of the positions of house-drains and their condition throughout the whole city. Their chief work is in detecting broken drain-pipes and defective gas-pipes.

The inspection of school-houses is carefully undertaken by this Board, by which the condition of the drains, the ventilation and lighting of the school and many other points are enquired into.

Your Committee would next refer to the precautions taken by the Board of Health in Boston for the prevention of small-pox. As is common at these seaport cities this disease is frequently introduced by immigrants. This has necessitated the establishment of strict quarantine regulations for such cases, while at the same time a city Small-pox Hospital is kept for the removal of such patients as the Board may deem necessary. Strict precautions, however, in the matter of vaccination are taken, especially where any number of cases, approaching an epidemic, has occurred. Thus last year vaccination offices were opened in 10 convenient localities, when 25,340 persons were vaccinated or re-vaccinated by thoroughly competent physicians, and with the best bovine vaccine. These gentlemen urge the desirability of something being done toward having vaccination regularly done by city authorities rather than have a rush during the times of a scare, when often the haste prevents its being done either thoroughly or with proper record being taken of the results.

This subject of vaccination brings your Committee to speak of the result of another part of their duty, in visiting a prominent vaccine establishment recommended by the Chairman of the Boston Board of Health for the high quality of the bovine vaccine supplied by it. Arrangements having been made for a visit to this establishment—the New England Vaccine Co., No. 10 Everett Avenue, Chelsea Station, Boston, Mass.—situated in Chelsea, a *faubourg* of Boston, we were taken there under the kind direction of C. F. Hodgkins, Esq., a gentleman connected with it, and there were introduced to Dr. Cutler, the Superintendent. This gentleman very courteously conducted your Committee over the premises, explaining at length the various details of the working of the establishment. A brief description of what your Committee then witnessed may not be out of place.

Dr. Cutler showed us in a dry apartment in the ground, kept cool by a refrigerator, and free from moisture by a hygroscopic substance, several air-tight glass jars, in which he kept his supply of "points." Dr. Cutler prefers the bone points, well made, to quills, although he uses quill-slips as well. Having gone to the stables we found there three animals, one matured and two maturing. These were young cows, Dr. Cutler finding them on the whole more convenient to obtain, and in every way better suited to his purpose.

The process carried out may be described as follows:—A healthy cow having been obtained from the farm a few miles out of the city, is brought to the stable and there vaccinated by means of incisions made through the epidermis and into the cutis of the posterior portion of the thighs, which have been previously shaved. Fresh and pure vaccine lymph from the matured vesicles of another animal is now well smeared on the wounds, when the act of inoculation may be considered as completed. All the available surface of the thighs posteriorly is covered with scarified patches two or three inches long and half that in width, at short distances one from the other. The cow is kept in the stable thenceforward, when by the eighth or ninth day the various incisions in each patch have become united into one enormous mass of confluent vesicles, with a diameter of two or more inches. Occasionally may be seen a single umbilicated vesicle, called a secondary vesicle, near the incisions, the result indirectly of the inoculation.

The work of preparing the bone-points is now gone about. The cow is secured so that she can do no injury, then the whole large scab is cut away thinly with as little flow of blood as possible. A short time is allowed to elapse, when the lymph begins to flow

freely from the surface of the abrasion. Everything having been done in as clean a manner as possible, an employé begins to charge the points, endeavouring to avoid the reception thereon of any blood, or anything else than pure lymph. This process is carried on with one of these huge vesicles until all the clear lymph has been appropriated for the points, when another vesicle may be proceeded with.

It is thus seen that to keep a large supply on hand one vesicle ought to mature at least every other day. We were informed that any points which are not disposed of within a week are re-charged, so that none but fresh vaccine is sent out.

This, briefly described, is the process carried out in the various vaccine establishments, with slight variations in mechanical details, such as the use of quill-slips, ivory points, etc., the portion of the animal inoculated, and the age of the animal used for vaccine purposes. Dr. Cutler does not consider it advisable to make use of *crust*, unless it be that from the true vesicle, occasionally forming near the inoculation vesicle, from the danger there is of having blood, pus and other septic matter associated with it.

Your Committee, while recognizing the desirability of having such a vaccine establishment in Ontario, if not under the immediate control of the Board, yet so closely associated with it in interest, as that it would be a condition of its success to supply reliable vaccine, does not feel that the time has come to do more than commend the project to the enterprise of such private persons as may undertake the many details involved in such a business. Whether to such an one it would prove a financial success must depend as largely upon the business energy of the individual as upon his scientific knowledge of the dangers to be avoided and the special ends to be sought.

The labours of your Committee next extended themselves to New York, when the working of the Board in that city was enquired into. As might be expected, the methods adopted there are much the same in nature as those of Boston; but there is one difference in the fact that here arrangements have to be made for the sanitary work of a city of 1,200,000 souls, confined within certain fixed limits, owing to the location of the city on Manhattan Island. In fact its work has to be carried on in something after the manner of an army Department. This Board of Health has also under its management the whole task of keeping the city clean—the removal of offal and night soil, the sweeping and watering of the city, the removal of garbage, the regulation of building sites, etc.,—all this being done by the expenditure annually of a sum approaching \$700,000. It is a huge machine whose work is only possible by thorough organization.

As already noted it would be both superfluous and unnecessary to detail all that was observed by your Committee in New York, but it will be desirable to point out here and there interesting points of difference.

Here, too, your Committee received every attention from the officers of the Board whom they met, and desire to place on record their appreciation of the kindness more especially of the Secretary, Col. Clarke, Drs. Day and Nagle, Mr. Collins, and various other gentlemen in the different departments of the Board.

Similar methods are adopted for dealing with nuisances as exist in Boston—by means of some fifty Sanitary Inspectors, who are also policemen, with powers of serving warrants, etc. Attached to the Board is a Law officer, whose sole occupation is to decide legal questions arising in connection with the duties of the Board. The department of its work, however, which is most in contrast with the custom of many other places, and which has been developed to such a high degree of perfection, is one which has to some extent grown out of the necessity for remedying evils consequent upon the crowding together of people in tenement houses, through the limited power which the city has for extending its boundaries.

The city was two years ago surveyed—an army of Inspectors took plans of every tenement and apartment house in the city, and these have all been entered in registers; the ground occupied, the height of house, the number of stories, the number of occupants, the position and condition of the house, the water supply, drainage, etc., are all noted. With these details in its possession the Board has endeavoured to rectify the evils arising from over-crowding, and these ends are carried out by the Inspectors. Not only are these plans of houses provided, but the Board requires that all plans of

houses to be built be submitted to it for approval. Before permission is given to erect buildings the owner or architect must fill in a blank form furnished by the Board, in which minute specifications for every portion of the work necessary to be considered with regard to health and safety are set forth. These specifications have to be brought before the Board, and be in accord with its views, before the building is allowed to be proceeded with, and they must be adhered to, frequent inspections being made to secure this result. A copy of the above form of specifications will be found amongst the documents enumerated at the conclusion of this Report. Tenement houses must be built with drains, water supply, &c., sufficient and good; sufficient light, and sufficient air-space; and before being occupied the work must be approved by the Inspector of Buildings. The department supplies landlords with models of buildings to be adopted, if desired, or if different to be altered in conformity with regulations. Licensed plumbers and gas-fitters only can be employed.

With regard to the disposal of excreta, the Board is gradually abolishing the privy-pit system. Whenever any of these receptacles have to be closed the *water carriage* system is substituted.

Independently of the system of Vital Statistics for the State of New York, which will be referred to hereafter, the City of New York has a very perfect Record of Statistics of its own. Great pains are taken to make this accurate and complete as regards mortality statistics, and with this object in view the rules regarding burial permits are very stringently enforced, no dead body being interred or sent out of the city without such permit. A very complete Mortality Report is issued weekly.

A vaccine farm is maintained in connection with the Board. This department is under the charge of Dr. Taylor.

Your Committee next visited the offices of the

STATE BOARD OF HEALTH OF NEW YORK,

at Albany, where they were received with the greatest kindness and courtesy by the affable Secretary, Dr. Elisha Harris, a Nestor in the work of sanitary science, who devoted himself during the entire day and well on into the night, to explaining to your Committee various matters connected with public health in the State of New York.

The first topic taken up was that of

IMMIGRANT INSPECTION.

The system of inspection in force on some of the routes of immigrant travel, from the port of embarkation to destination, has been fully described by Dr. Rae in his Report of the Convention at Port Huron. Your Committee need merely allude therefore to the various points in the system as carried out in the State of New York.

There are two Inspectors—medical practitioners of course—in the State. One of these acts on the New York Central and Hudson River Railway. Residing in Rochester, he meets the train at Syracuse or some point between there and Albany, according to the size of the train. On boarding the train he obtains from the conductor information as to the number of cars, number of passengers, reports of suspected disease and other points necessary to the passing of his weekly report to the Secretary of the Board, and which will best be shown by the subjoined report for the week ending 23rd of August, which report had just been received by the Secretary on the morning of our visit.

	AUGUST								
	17th	18th	19th	20th	21st	22nd	23rd	Totals	
Number of Cars	6	3	6	2	0	10	3	30	Vaccination protection cards were exhibited by 935 persons.
“ Passengers.	211	117	187	60	0	398	114	1094	
“ Sick	0	0	0	0	0	0	0	0	No cars in a filthy condition.
“ Dead	0	0	0	0	0	0	0	0	On the 17th emigration was greatest to Illinois and Wisconsin.
Via Buffalo.....	206	112	181	66	0	387	108	1060	
“ Suspension Bridge.	2	5	6	1	0	5	1	20	On the 18th, 19th and 20th to Illinois, Ohio and Wisconsin.
“ Rochester	0	0	0	0	0	4	1	5	
“ Lyons.....	3	0	0	0	0	2	4	9	On the 23rd to Illinois and Minnesota.

The Sick had..... (No sick).

Death was caused by..... (No dead).

Concerning Loss of Cards :—159 were without cards ; some were Americans.

The Number and Condition of recent Vaccinations (within 7 days) :—The whole number, 184 ; successful, 83.

Concerning Immigrants never Vaccinated :—There were not any.

Destinations of the Sick.....

The Suspicious, and Facts Contagion.....

(Signed)

ALBERT L. PERRY,

Inspector of Immigrant Trains at Rochester.

A separate sheet gives “destination of [all] immigrants.”

After obtaining all available information from the conductor, the Inspector enters the passenger cars. Holding up the fac-simile of the “Vaccination—Protection” card, he requires passengers provided with them to exhibit them. Those who have them not are examined as to vaccination, and, if necessary, they are vaccinated. A cursory examination of all is made, it being more exact if circumstances point to the necessity for its being made so. If any are found so sick as to render it unsafe for themselves or others that they should proceed, the Inspector telegraphs to the first suitable stopping place and has them put off and properly cared for. In this way the lives of some children (apparently moribund from a virulent attack of measles) were saved shortly before our visit. The sanitary condition of the cars is also noted, as will be seen by a reference to the sample report given above. It is needless for your Committee to point out how many valuable items of information are stored up in these reports, both for sanitary, statistical and other circumstances, and of what benefit the system may be with immigrants and to the public amongst whom they come. These points will be apparent to any thoughtful person, upon a perusal of the reports.

It will be seen by a reference to the report, that the immigrants follow two divergent lines from Rochester (the relative numbers in some weeks are the reverse of those given in the sample). The Inspector will have at least finished the inspection of the cars for one diverging road before reaching Rochester, and can then go on with the unfinished one after leaving the first.

The other Inspector, on the Erie Road, has also two routes, which again sub-divide into four—one for the southern shore of Lake Erie, one for Dunkirk, and two for points to the north of this.

It is not yet definitely determined how bills for persons detained *en route* are to be settled. They are sometimes borne by the Federal, sometimes by the State, organizations.

Another matter which engaged the attention of your Committee was the

ORGANIZATION OF LOCAL BOARDS OF HEALTH,

and their relation to the State Board and to the people. In this connection there is one point which your Committee would recommend to your consideration, viz.: That it is the duty of every municipal organization in the State to appoint a Local Board of Health, and every Board of Health has to appoint a Medical Health Officer. Hence it is a known and recognized fact throughout the State that there are matters which require constant official oversight with a view to the preservation of health in communities; and by a general provision of the Legislature, the services of certain persons are secured for such oversight—they making it their business to look after matters connected with the health and safety of the people in the community to which they belong; whereas, with us the council of the municipality “*may* delegate the power of its members as health officers to a committee of their own number, or to such persons as the council thinks best;” or it may attend to health matters, or neglect them, as the case may be, amidst the hours of its other business. In conversation with a prominent member of a rural municipal council a few days ago, some remarks were made which led one of the members of your Committee to ask if his council had responded to requests contained in one of the circulars addressed to it by this Board. He replied that when they got through other business more immediately pressing on their attention, they had no time for such matters as I referred to, and the circular was lost sight of. Similar experiences have been related by other members of this Board. The Legislature of the State of New York, like that of Michigan, provides against this; and it may be with the intention of more emphatically preventing any such danger of neglect, that the law of New York enacts that the members of Boards of Health of cities and incorporated villages, shall not be members of the council; a provision which we might think goes too far. In this State, as in Michigan and many others, every municipality must have a *Medical Health Officer*. These *bona fide* Local Boards, in existence throughout the State, form an excellent channel, both for obtaining and imparting information, and for carrying into practical effect the advisory measures and plans resulting from labours of the State Board.

The system of

VITAL STATISTICS

in operation in the State, was next explained to your Committee. As in our own Province, the Births and Marriages are registered as well as the Deaths. All the original certificates (except from Brooklyn, New York, Yonkers and Buffalo, which have special charters of the olden time) are filed in the offices of the State Board. It will be observed that the form of Death certificate embraces many more points than is usual in other countries. Your Committee would draw your attention to the fact that the law forbids the removal by carriers of any dead human body without a permit, so that they have a transit permit, as well as the burial-permit which they have in common with us.

The Board renders good service in

INVESTIGATING AND REMEDYING NUISANCES,

some of them similar to some of those in regard to which we have been called to act during our short existence. Two or three of these were on hand at the time of our visit, some caused artificially by manufacturing processes, and one, a very singular one, produced by progressive changes of nature. A hill stream had by its impetuosity at a certain curve in its course, changed its channel and formed a marsh or sheet of stagnant water, giving rise to malaria at a point very high above the surrounding country. Dr. Harris was planning to visit the spot with one of their Sanitary Engineers on the day following our visit. In many of these investigations the services of a sanitary Engineer are called into requisition, as in

ADVISING MUNICIPALITIES REGARDING DISPOSAL OF SEWAGE,

a matter in which large co-operation and interest exist between the State and Local Boards and Municipalities.

The endorsement by the Governor of the recommendations of the Board regarding nuisances (those on a large scale only being taken up), and other such matters, gives to them Executive force. The Board has also been engaged in collecting information regarding, and otherwise

INVESTIGATING THE CAUSES OF CERTAIN DISEASES.

Some of these investigations have been carried on in connection with other State Boards and the National Board. The subject of one of its investigations is

MALARIA,

and the sets of questions sent out to obtain replies, and the little skeleton maps to be filled up by correspondents, will be found among the papers accompanying this Report, as also will circulars connected with similar investigations of other subjects of sanitary interest, such as the condition of School Houses throughout the State.

The laws regarding contagious diseases, and other sanitary matters, are similar to those in our own Province, and the work of the Board similar to ours.

Their Constitution allows the State Board to deal with the adulteration of foods and some other matters, which with us will come more properly under the cognizance of the Dominion authorities (as well as of the Municipalities).

Your Committee also received from Dr. Harris a copy of the By-laws of the Board of Health of the city of Albany.

Your Committee further took occasion to enquire at Portland, Me., into sanitary matters there. The organization there is very poor and defective, and there was little information to be obtained. The City Engineer explained some matters connected with the sewage of the city, a tumbling basin in a low part where there was little fall being a point of interest. This gentleman presented your Committee with a copy of the reports of the various officials of the city.

Since writing out that portion of the Report bearing upon immigrant inspection, your Committee have come across the following newspaper item, in which the exception proves the general rule as regards the benefits of that system, and the dangers avoided by it:

HOW INFECTION SPREADS.

Hornellsville, N. Y., November 27th.—“ Roy Robinson, the Erie employé who unknowingly cleaned the car on which Weston, the smallpox patient, had lain for some time, began breaking out with the disease on Friday night. Some members of a family named Ford, with whom Robinson boarded, have also shown signs of infection. Dr. Robinson has charge of the unfortunate man's case, and every effort is being made to prevent the spread of the disease.”

DOCUMENTS OF THE NEW YORK HEALTH DEPARTMENT.

- A.— 1. Registration of Master Plumber.
2. Registration of Journeyman Plumber.
3. Weekly statement.
4. Notice to submit Plans and Specifications.
5. Notice of Violation.
6. Inspector's Report of Plumbing and Drainage.
7. Copy of Act to secure Registration of Plumbers and Supervising of Plumbing in New York and Brooklyn.

8. Notice of Violation.
9. Specifications of Plans for Plumbing and Drainage.
10. Application for permission to lay Earthenware.
- B.—11. Permit for Tenement Houses.
12. Plan for Lighting and Ventilation of proposed Tenements.
13. Tenement House Acts.
14. Plans for a new Building.
15. A number of plans forwarded.
- C.—16. A Night Medical Service.
- D.—17. Sanitary Code of the Board of Health.
18. Sanitary Inspector's Report.
- E.—19. Reported Mortality with Actual Mortality for 1880.
20. Summary of Births, Marriages, and Deaths.
21. Birth Returns.
22. Return of Given Name for Children.
23. Certificate of Death.
24. Return of Still-births.
25. Transcript from Return of Births, Marriages, and Deaths.
- F.—26. Application for a Transit or Disinterment Permit.
27. Transit Permit.
28. Returns of Marriages.

DOCUMENTS OF THE NEW STATE BOARD OF HEALTH, ALBANY.

FROM DR. E. HARRIS, SECRETARY.

1. Organization and Powers of Local Boards of Health.
2. Laws relating to Registration of Births, Marriages, and Deaths.
3. Domestic Pestilences and Sanitary War against them.
4. On methods of Sewerage for Cities and Villages.
5. Records of Vaccination in New York State.
6. Annual Report of the New York State Board of Health.
7. An Act for the Preservation of the Public Health.
8. Powers and Duties of Local Boards.
9. Prevention of Diphtheria.
10. Notes on Contagious Diseases of the Eyes in Schools and Asylums.
11. Report on the Methods of Sewerage for Cities and large Villages.
12. Duties and Procedures of Local Boards of Health, with appended Memorandum on Contagious Disease Refuges.
13. Memorandum of Rules to be adopted to prevent the Spreading of Contagious Diseases in Schools.
14. Sanitary Rules for the Prevention of Scarlet Fever.
15. Sanitary Precautions to prevent the spreading of Infectious Diseases.
16. Instructions for Disinfection.
17. Concerning Vital Statistics and certified Records.
18. Prevention of Smallpox.
19. State Regulations concerning the Transit Permits for Burials beyond County Limits.
20. Statement relating to the Law for Safety-testing Illuminating Oils.

ARTICLE III.

REPORT OF THE DELEGATE OF THE PROVINCIAL BOARD OF HEALTH
TO THE INTERNATIONAL SANITARY CONGRESS AT GENEVA.

To the Chairman and Members of the Provincial Board of Health:—

GENTLEMEN,—A brilliant assembly gathered in the Aula of the Geneva University, at two o'clock in the afternoon of Monday, the 4th of September. This very beautiful edifice, in the Grecian style of architecture, approached by a lofty flight of steps, is situated in the Rue de L'Université, looking into the Jardin des Bastions. The Aula or Convocation Hall, with its three galleries capable of holding a very large number of persons, and with acoustics all that could be desired, was admirably adapted for the purpose of holding each afternoon session of the Sanitary Congress. On the lower floor, five large class-rooms were set aside for the morning attendance of the various sections.

Dr. Lombard, of Geneva, occupied the Chair; most enthusiastic applause from the large audience following when Dr. Pasteur took a seat by his side. M. Lombard first called on one of the authorities of Geneva to address the audience—M. Schenck. He remarked that Switzerland was the country of all countries for international congresses, especially as their motives were calculated to be of general benefit to humanity. The preference which Geneva enjoyed was due, not merely to her geographical position, but to the ready sympathy of her population and the ardent champions any good cause would find amid the Swiss people. It was to Geneva that the honour of the International treaty for the succour of the wounded in war belonged, and at Geneva a great war had been prevented by the arbitration with respect to the Alabama claims. Switzerland having much to learn, was particularly eager to welcome the Sanitary Congress. The death rate was not 17 per thousand, but in certain Cantons it varied between 25 and 29 per thousand; and they hoped to learn from the discussions that would take place, the best preventative means for diminishing this excessive mortality. Another category of avoidable disease was that of zymotic ailments, which, in Switzerland, carried off each year large numbers of individuals, a great many among them, middle aged, leaving after them orphans chargeable on the ratepayers. Other important causes of death indicated in the mortuary tables are consumption, alcoholism, suicides and other diseases, which, in a great measure, are equally avoidable. Although Hygiene was held in honour by the nations of antiquity, and we have reason to acknowledge that the sanitary laws of Moses have contributed to give to the Jewish people the remarkable vitality which is peculiar to them, it is nevertheless true that to our age, and to a period relatively recent, the honour belongs of having first made apparent, and chronicled its happy results. Although all agree that health is the very first of blessings, a small number alone are conformable to the wise laws of Hygiene, and the majority—we state it with regret—are still slaves to the prejudices of the past. May this Congress of Hygiene and its exhibition, that we welcome to-day, contribute to dissipate the errors and to enlighten public opinion! May your generous work, which is announced under such fortunate auspices, bring its stone to the edifice always unfinished of human progress!

M. Heridier, President of the Council of State, after welcoming the members of the Fourth International Congress, stated that the choice of their ancient city for holding the Congress was an honour for Geneva. International Congresses for the advancement of science are homage rendered to social progress. They make the imperfections and the vices of our modern civilization to disappear by the light they ceaselessly shed, breaking down those scourges of humanity, ignorance, routine, fanaticism, tyranny and war. The middle age, with its long centuries of ignorance, when the body was neglected in attention to the soul, when prejudices and vicious customs were regarded as holy, and Hygiene disregarded, was often most cruelly punished with pestilences, plagues, and desolating epidemics.

May the sun of science and light illuminate the whole universe, without distinction of race or language, so that nations and individuals may live more and more under better conditions of peace and prosperity!

M. Le Cointe, Delegate of the Administrative Council of the City of Geneva, thanked the Congress for the privilege they had accorded in choosing the city of Geneva from among others, as a place of re-union of delegates from such very diverse nationalities. "Animated with sentiments purely philanthropic, you seek outside of all distinctions of nationality, the true interests of the classes of working people, so numerous and important; in improving their health and rendering their humble abodes less gloomy to live in; in giving to the country as to the cities; to adults equally with children, the knowledge requisite for assuring their well-being; you seek to augment their bodily strength, and by that to multiply the moral and intellectual forces of individuals. It is to the economist, to the school-master, to the working man, to the philanthropist, to public administrators that your science addresses itself, and under this bearing the municipal authorities are the first to be benefited by your labours. In your programme prominently appear questions to us of great interest. Alcoholism makes considerable ravages among our urban and rural populations. Teach us gentlemen the best means of combatting this formidable enemy to the home! You will, during your session, traverse our streets, visit our schools, inspect our public establishments, and your attention will naturally be directed to the habitual subjects of your specialty. You will, doubtless, from a hygienic point of view, find matter for observation, and we invite you to make a frank exposition of all local defects. The Swiss were a proud people, but our motto '*Post tenebras lux*,' will be to you a sure guarantee that we seek light on everything and everywhere, and we shall endeavour to profit as much as possible by the instructions you bring to us. May the city of Geneva abundantly profit by your labours."

Dr. Lombard, as President of the Committee of Organization in offering welcome to the International Congress remarked that while the members could not expect the royal reception and sumptuous entertainments which they had received at Turin, they might depend on the most cordial greeting. "We most cordially invite your coöperation in elucidating the numerous questions contained in the programme we have prepared for this Fourth Congress of Hygienic and Statistical Science. Before entering upon them, allow me to offer a few observations on the hygienic improvements which have been accomplished in the city that has the honour of receiving you. It was not the present generation, but their ancestors, who were to blame for their narrow streets, but they were not chargeable for not having adopted modern improvements, neither were they responsible for the anti-hygienic conditions that resulted from the construction of a city shut in by fortifications, the houses having to compensate in height for the very narrow spaces reserved for them; as a consequence air and sunlight penetrated with difficulty into these dwellings. One street alone, the Market, was the exception, but this was so obstructed by the stalls of a permanent nature that light and air could with difficulty circulate in these houses of four or six stories along the street which constituted the principal business thoroughfare. That happily now is in the domain of the past, but is sufficient to explain why fifty years ago very numerous cases of spinal diseases, of goitre and of scrofula were to be found in our streets, whilst actually these infirmities have now become to a certain degree exceptional. It was not only the interior of the city that presented numberless imperfections, it was also the borders of the lake and of the river Rhone, which were lined with hovels and tumble-down buildings, the appearance of which was anything but pleasant. At the same time the absence of docks allowed the water of the lake to penetrate into the streets with all the *debris* derived from the delapidated houses on the river. This condition no longer exists, as you will have noticed in passing along our quays, with elegant houses and ornamental gardens bordering them. But the most important transformation without doubt, from a hygienic point of view, was the removal of the ramparts and the filling up the moats surrounding them, which enabled the authorities to lay out spacious streets where air and light freely circulated, and where a large number of private mansions, as well as of public edifices, such as the one we have the honour of receiving you in, which contains not only the large halls and lecture rooms of the university, but also one wing devoted to a museum of natural history, and the other to a public library. The suburbs and environs of the city have been covered with neat houses situated in gardens, where the citizens can respire

the pure and vivifying air of the country after the fatigues of the workshop and of the counter. As for those who cannot live out of the city, our magistrates have procured for them the enjoyment of five or six parks and gardens, where you see every day the children diverting themselves and the old people warming themselves in the sun. Geneva was built on an amphitheatre, freely swept by the prevailing winds, notably the cold north wind. This might tend to increase neuralgic and inflammatory diseases, but it carried away or arrested the development of epidemics, as was evidenced when cholera visited us for the first and last time, and when, instead of spreading, it disappeared in a few days under the influence of a strong north wind. The same happened when a bad epidemic of influenza had attained a great development, and it sufficed for the advent of the north wind to make it cease instantaneously. The water supply was also remarkably pure, according to Professor Tyndall one of the purest in Europe. We should be rejoiced if this scientific endorsement encouraged our citizens to make greater use of it, and not to substitute for this healthy and inoffensive liquid alcoholic liquors, the ravages of which are daily increasing amongst our population. This scourge reckons every day numerous victims, the proof of which is unhappily furnished by the number of drunkards admitted to the wards of the hospital, a number as large in a single year as it had been during thirteen years of my services at the old hospital. Even allowing amply for the increase of population which is certainly not thirteen times larger than formerly, we are forced to consider this enormous augmentation as a very sorrowful progress of the abuse of alcoholic drinks. In passing from drinks to alimentation we can affirm that that of the inhabitants of our city is substantial, abundant and of good quality. As regards butchers' meat, I have found by a table published by a German doctor that Geneva occupies a high position in animal consumption. I can confirm this by personal knowledge at the time that I visited a great number of patients among the working classes, as I found generally on their tables excellent meals, soup, meat, and vegetables. It is very probable that this substantial nourishment contributes much to the diminution of spinal and scrofulous affections which formerly were so wide spread. Further the visitors will have seen that the schools are built like palaces, palaces not for the dwelling of kings, but for the education of the youths who are to become the sovereign people.

The Secretary-General then read his Report, from which it appeared that the governments of France, Italy, Spain, Roumania, Hungary, Holland, Servia, Sweden, Mexico, Portugal, Prussia, Bulgaria, Canada, Switzerland, and Belgium had sent special delegates. Further delegates were sent by the Municipalities of Rheims, Bucharest, Geneva, Paris, Lausanne, Neuchatel, Roth, Seville, Lisbon, Nancy, and very many other towns. A number of societies and academies from all these towns and countries, had also sent official delegates.

Dr. Pachiotti, President of the Turin University and of the third International Congress of Turin, then delivered a most eloquent and fervid speech, proposing that Dr. Lombard should be President of the present Congress. Want of space alone prevents me from translating this most impassioned and classic oration, the most telling of all delivered during the session of the Congress; any abbreviation would do injustice to the grace of diction and Ciceronian eloquence by which it was characterized.

After the appointing as Honorary Presidents of the Congress the delegates from the respective countries represented, and delivery of other speeches from M. Fauvel, Van Overbek de Meyer, Czatory, Georgewitz, and Varrentrap, the first sitting of the Congress was closed, the members retiring to their respective hotels to prepare for the official reception held the same evening in the Foyers of the Grand Opera by the City authorities. This proved to be a most brilliant affair. The reception salons were magnificent in structure, proportion, and decoration; the hospitality of our civic hosts unbounded, and the fine selections from operatic music by the band of the Conservatoire formed most agreeable interludes to the hum of conversation carried on in almost every language of Europe.

TUESDAY, 5TH SEPTEMBER.

In the morning, at the time appointed, the members of the Congress distributed themselves into five sections:—1st, General Hygiene; 2nd, Public; 3rd, Application of the Science; 4th, Hygiene of Schools and Veterinary Hygiene; 5th, Demography or Statistics, and put in practice the principles of this division of work.

In the second section the principal subject, the disinfection of the rooms and garments of patients labouring under infectious diseases, was introduced by Dr. Fatio, of Geneva. His discourse was principally limited to a series of experiments that he had made, principally on the effects of sulphurous acid for the above purpose. Professor Vallin, of Paris, brought forward some observations differing from the previous speaker, and made an excellent address, founded evidently on a long and careful study, not only on the effect of sulphurous acid, but also on the comparative effects of other disinfecting substances, showing that it does not suffice to discover a sure method, but that it is necessary that the agent employed for destroying the microscopic germs, animal and vegetable, that we are scourged with, should realize two other conditions—one that it should not injure the fabric of the garments or bed-clothes to be disinfected, the second that it should be cheap and of easy application by the public. Finally that we must recognize that with the exception of some chemical vapours, it is hot and moist air which is the most efficacious destroyer, and the most easy of employment. As a preventive means, M. Vallin particularly desired that the hospital attendants should be dressed in a long houppe-laude (overall, or long woollen riding coat) during the time they were exposed to infectious contact, and that these should be laid aside immediately after quitting the wards; that the attending physicians should change their clothes, and be very scrupulous in regard to washing the hands and nails. After a reply from M. Fatio, Dr. Sonderegger, of St. Gall, read a communication written in German, afterwards an abstract of it rendered into French, by the Secretary Dr. Cheneviere, who laid down certain propositions: 1s, That the hygienist ought not for a moment to pretend to perfection, but should content himself with those means which for the present state of the science may be considered the most rational, until further progress has been made; 2nd, That the physician should be equally scrupulous with the surgeon in the disinfection of his clothes and body. He recommended principally the vapour of chlorine. To his colleague, Dr. Ambuhl, he confided the task of explaining two well executed pictures—the first representing a soldier's sentry box, furnished with a door, with a round aperture at the top; by a lower drawer or slide, the substances required for developing chlorine are introduced. The person to be disinfected enters the sentry box and in order to breathe during the chemical discharge of vapour, he places the nose and mouth at the aperture at the top. The second apparatus is a species of stove or kiln destined to receive the garments which are to be disinfected by the same method.

The physician of the Hospital for Children at Zurich, read in French and German a paper endorsing the experiences of the professor of St. Gall, and proving, among other things, that contagion reappeared immediately that the hygienic precautions recommended by the latter were neglected. Some other delegates spoke on this important subject; one of them remarking that corrosive sublimate is the most destructive substance for these microscopic elements, especially for spores. Dr. Bourneville, of Paris, terminated this most interesting debate by a recital of his views of the necessity for the creation of schools for hospital nurses and attendants. In the third section or application of hygienic science, M. Durand Claye treated on the question of drains. In the first section, General Hygiene, MM. Arnould, of Lille, and De Feremille, of Lausanne, discoursed on the question of the etiology and prophylaxis of typhoid fever. Afterwards Dr. Czatory, Member of the General Council of Hygiene of Hungary, expressed with warmth the necessity for an International Hygienic Convention, of which he foreshadowed the principal objects: 1st, that the International Hygienic Convention should have for its aim the establishment of general laws for everything concerning the protection and maintenance of public health; 2nd, that all governments who have established equal laws relative to public Hygiene, should join this International Convention; 3rd, the consenting governments should abolish all difficulty relative to free circulation

and commerce ; 4th, a committee of international surveillance, constituted of delegates from the consenting States, should superintend the scrupulous observance of international Hygienic ordinances.

In the event of the present Congress accepting the principles of this Convention, M. Czatory proposed : that the Congress of Hygiene, now assembled at Geneva, should nominate a committee of seven or nine members, to frame the special articles of the Convention ; that the work of this Committee should be submitted for discussion at the next meeting of Congress, and, after conclusions had been arrived at, they should be presented to the respective governments, as the advice of experts in public hygiene. The Committee named will establish, during the sitting of the present Congress, the *modus procedendi* that it will follow in the work confided. These propositions were adopted.

At two o'clock the public attended with impatience the discourse promised by the celebrated Pasteur, on the question which day by day grows in importance from the discoveries made by this illustrious worker, and also from the practical results that at present we have only glimpses of. The discourse related to a subject, but little known to the general public, known as the attenuation of virus. A paper that occupied nearly the whole afternoon, can only be briefly summarized ; M. Pasteur's experiments and labours may then be thus epitomized : Our knowledge of virus began with chicken cholera, that we succeeded in attenuating and preserving for inoculating other fowls. To obtain this precious modification it sufficed to expose the virus to the oxygen of the air. These facts relative to the microbes, or microcci, of fowl cholera, were applied to charbon by experiments, made with the valuable assistance of Doctors Chamberlain and Roux. It is to be regretted that M. Pasteur, whose reputation as a scientist is world-wide, should, during his address, have alluded in a manner which, to say the least of it, betrayed irritation with Dr. Koch, of Berlin—who was present in the theatre of the University, and who, as is generally known, has been opposed to some of the views of Pasteur—on scientific grounds only ; and the author, in quoting, pronouncedly displayed his regret that this scientific and international tourney should at times have been characterized by a departure from parliamentary rules. The Professor recalled a series of experiments that were made on two children and on a workman who had died from hydrophobia, and from whom the salivary mucus had been taken for the inoculation of rabbits, which proved that they had to deal with a virus that was transmissible, and could, so to speak, seed itself successively on a series of animals. He affirmed that microbes, cultivated unexposed to oxygen, became more and more virulent, whilst those exposed to oxygen became progressively attenuated. M. Pasteur's address had for its principal end the proof that there is in this fact a precise law which finds numerous applications. That which it is necessary to be assured of, is, that it is with the microbe of the virus that we have to deal, and that virus has not been preserved long enough ; that another virus may be developed from it—that of septicæmia—which alone would suffice to cause death by inoculation, and occasion confusion in results. These experiences have been communicated to the Academy of Medicine, and confirmed by those of Dr. Maurice Regnault, repeated at the Hospital St. Eugene. From all these experiments carefully performed, the evidence results of the existence of a hydrophobic microbe. M. Pasteur then entered into the examination of an important question, viz.: to establish the connection of cause which exists between the presence of this microbe, and the development of rabies. At this time he answered the attacks that had been made on him by M. Koch and his disciples. He mentioned that several points in this paper were unpublished and novel, and made the observation that there was a parallelism between his experiences relative to the microbes of cholera of fowls and those relating to rabic virus. This microbe is found in the blood. Up to the present then, three very different and distinct microbes have been found : 1st, that of fowls ; 2nd, that of charbon ; 3rd, that of rabic saliva. But a fourth microbe has been recently found by M. Pasteur ; which will confirm the general law, that which is developed in the epizootic of typhoid in horses, a scourge to which 1,500 horses of the Paris omnibuses have fallen victims. The virus of the nasal discharge communicated with its attendant microbe to rabbits, developed the same fever (typhoid) that can be established by the pathological characters that are found in ordinary typhoid. M. Pasteur, however, does

not commit himself to any positive dicta on the observations, not yet confirmed, between the microbe of this epizootic, and the development of the typhoid of the horse. After a series of gropings in the dark, to arrive at an attenuation that would suffice, he finished by obtaining a virus that would no longer produce typhoid, but which, on the contrary, would antagonise it. The speaker called to mind that we are now in the presence of a general law relative to inoculation, and to a general method for its application. These principles give us right to entertain the most legitimate hope for a new method of preservation. The Professor called to mind that the Minister of Agriculture in Prussia, notwithstanding contradictory writings, made haste in appointing a commission of competent men, charged to examine the question minutely, and, if possible, to arrive at a decision. The important conclusions of this commission have been published, but the speaker had not the time to give a recital to the audience. M. Pasteur related in detail the experiments made in Berlin on a great scale, by order of the superior authorities, with the tubes that he had sent them, in the presence of experts, and intermedial with his delegate, M. Thulier.

An important subject is that of the rôle played by earth worms ; the question was to know by what manner the contagion was communicated to animals browsing on grass growing over a place where the carcasses of animals dead from charbon had been buried. The existence of the spores of charbon was established on the surface of this ground. After having examined in a state of solution in water the earth of this surface, it was possible to determine that it was the excrement of the worms which was the carrier of these virulent germs. Dr. Koch was taken to task by M. Pasteur for the scientific reproaches that he had levelled at him, and was invited by him, and the invitation extended to other opponents, if any were present, to take his place on the platform and state their views. M. Koch, being loudly called for, took his place at the platform and asked permission to speak, and in a few words in German reserved his defence for another occasion, not being desirous of entering into a discussion in a language that was not understood by all, and stated that he reserved his defence for publication in the scientific journals. Dr. Sermani, of Pavia, then read a succinct but comprehensive report on the experiments made in Italy for comparison with those of M. Pasteur, experiments which—although not absolutely conclusive—did not in any measure weaken the conclusions of M. Pasteur. Professeur Balesterri, of Genoa, stated his opinions on the subject, especially in his experience from a clinical point of view. In a loud voice and with much gesticulation he proclaimed his opinion that an exaggerated view was taken of microbes—as factors of disease—in the greater number of virulent affections. In the same manner he affirmed that the fish in the sea could not exist if there was not water in the sea. Equally microbes could not originate, be developed and live, but for the existence of a special nidus, which is the virulent liquid of each infectious disease. M. Layet, of Bordeaux, closed the debate by affirming the great importance from a hygienic point of view, and especially from a prophylactic which M. Pasteur's researches possess.

M. Lombard (the President of the Congress) before closing the sitting, affirmed the principle of strict impartiality that should govern all scientific questions, and he warmly thanked M. Koch for having raised a dissentient voice, for that it is in the shock of opinions that light, that is to say, truth results.

At half-past six in the evening the members of the International Congress were conveyed by omnibuses to the country residence of Professor De Candolle. The costumes of those Scientists and Doctors of Medicine were strikingly varied from the plain evening dress to brilliant uniforms, and lappels of the coats blazing with sparkling orders. But dress, according to the proverb, does not make the man, and to judge from the reception accorded to all by Messieurs and Madame De Candolle, the proverb was acceptable in this instance. This lovely country residence was brilliantly illuminated, but large as it was it proved too small for the numbers congregated ; the overflow was therefore distributed in the Park—brilliantly illuminated with coloured lanterns—in which they thoroughly enjoyed the delightful evening air. At eight o'clock a splendid banquet was served. The ladies, as on the evening previous at the Foyers of the Grand Opera, were in a minority. Some of the German Professors made a calculation of how much they must economize in marks and pennings to be enabled in their old age to

offer to a similar gathering receptions equal to those of their Geneva hosts, and arrived at the sorrowful conclusion that the Professors of the Empire could only arrive at such a result when each of the members had attained the age of Methuselah. During the whole evening the greatest animation and gaiety prevailed, thanks to the hospitality of the De Condolle family, and when at half-past ten the omnibuses and carriages bore away the guests, all were of opinion that they had been most sumptuously entertained by the representatives of a great name.

In the morning of this day the safety ladders in fires were exhibited. A very great number were on exhibition. The opinion of the large number gathered to witness the exhibition was conflicting. A specialist remarked that these ladders to be of real service must be frequently manœuvred.

THIRD DAY.

In the second section, that of Public Hygiene, presided over by M. Piachaud, Colonel Ziegler, the principal medical officer of the Swiss army, opened the debate by his report on the results of faultily conceived and badly made shoes, an important question not only from a hygienic point of view, but also for the military force of a country. He stated that the small Swiss army loses a large percentage of efficiency in the recruits in consequence of the deformity of the feet, caused by the faulty construction of the shoes, that this cause for complaint will cease when the shoemakers understand and properly practice their business. Let us commence by studying the normal form of the foot in the new born, and in those who walk barefooted. If we take an impression on the ground of a natural foot we behold the first principle, the most important of all. It is necessary that the prolonged axis of the great toe should pass by the centre of the heel. The foot is in reality a vault which is flattened and elevated at each step by the elasticity due to its admirable organic mechanism. The shoemaker as a rule but little acquainted with the anatomical form of the foot, fancies he imitates nature but is deceived. One of the greatest faults consists in not giving to the great toe sufficient freedom of lateral movement and to crushing it pitilessly outwards, that is to say to the side of the other toes. From that irritation or inflammation of the great toe arises, the nail acquires fleshy granulations, corns, ulcerations, and sometimes a veritable articular inflammation. But there is another serious evil which the speaker attributed essentially to the formation of the shoes. It is the development of flat-footedness, that is to say an abnormal state in which the vault of the foot disappears. Excessive weights carried at too early an age causing a relaxation of the aponeuroses, may also be fairly considered as causal, but faulty shoeing is principally concerned, and when we can accomplish an improved system, the very large number of men disabled by it in armies will disappear. The two shoes of a pair well made ought to touch at two points, the great toe and the heel. The shoes should be fifteen to twenty millimetres longer than the foot, on account of the normal elongation in walking. Thirdly, the shoe should reproduce the natural projections and hollows of the form of the foot. The Colonel passed on from these details to military shoe material and making. Should the soldiers wear shoes, half-boots or buskins, or long boots? In Italy and Germany alone is this made a subject for regulation. The practical conclusions of the paper for curative means, were, 1st, practical instruction given to military shoemakers; 2nd, obligation for a normal system in all military establishments dependent on Governments; 3rd, enforced concurrence, by the creation of a manufactory of shoes on physiological principles. M. Ziegler considers that such an enterprise would be a paying one.

Professor Roth, who has for a long time been engaged in the study of this question, exhibited shoes manufactured in London, which in reality are in agreement with the principles laid down by Col. Ziegler. These shoes are based on the rule that the interior border of the sole is a straight line, which in reality approaches to the rule indicated by Colonel Ziegler.

After these interesting remarks by previous speakers introducing the subject, Dr. Jaeger entered into an examination, not of the form but of the material employed for shoes, and affirmed that the leather we employed had a bad effect on the feet. He repudiated tanned leather and every variety of blacking, and recommended especially wool-

len, felt, and deer skin, exhibiting specimens which appeared very reasonable. More than two hundred persons who had followed his advice made the ascent of the Swiss mountains without inconvenience. A long discussion ensued between many of the assembled delegates on the question of whether it is truly the present form of shoes that is the general cause of deformity, particularly of flat-footedness.

M. Vallin, Deputy from the Ministry of War in France, and Professor of Hygiene at Val de Grace, admitted that in France the form of shoes is very bad, and that from this discussion his country might derive profit. He recognized also that from this cause all feet are more or less deformed. It was necessary to distinguish among other things the form of shoe of the Parisian gentleman and Parisian lady, that of the latter being essentially (with the high heels) bad and anti-hygienic. Dr. Gosse mentioned that to some extent the shape of the foot would be dependent on race.

Replying to his interlocutors M. Ziegler deplored that fashion should govern so much in this as in other matters—that the husband should be so much under the slipper of the wife.

In the afternoon the general sitting of the Congress was opened by a discourse from M. Corradi, of Pavia, on the question of *Phthisis Pulmonalis*. Formerly there existed in Italy a legitimate terror on the contagion of Phthisis, and everything was destroyed that had been used by the patient. At the present time careful disinfection of everything and washing was relied upon. Reference was made to the special microbe of Phthisis. This microbe extracted from the sputa of patients suffering from the disease, was reproduced by culture and propagated by inoculation. Professor Corradi proposed the prevention of cohabitation with the phthisical; the abstaining from food derived from phthisical sources, including milk; to avoid the use of vaccinia from phthisical heifers and infants, and to institute special hospitals for the isolation and treatment of phthisical cases.

M. Lendet, of Rouen Hospital, read a paper of a clinical character relative to its contagion, in which he expressed the opinions resulting from his observations derived from fifty-six households, that a husband communicates more frequently the disease to the wife than the wife to the husband. One of the consequences that the speaker drew from his experience was that marriage between a tuberculous and healthy person should be strongly protested against.

M. Vallin was of opinion that science is not yet sufficiently advanced on the question of contagion of Phthisis to require at present the establishment of hospitals *ad hoc* for consumptives, as for other contagious maladies, such as smallpox, etc., etc., and was of the opinion that for the present all prophylactic ordinances would be premature.

M. Adolphe Smith, the special correspondent of the LONDON LANCET, enquired of the Congress whether a great number of cases of Phthisis in cities could not be attributed to the drains as sources of the tubercular microbi, also in general to all anti-hygienic waters which are used by large populations, to imperfect sewerage, disposal of sewage, and general faulty drainage. I omit the discussion on M. A. Smith's views which were generally concurred in and pass on to another very interesting question which recently in Germany, Switzerland, England and the United States has occupied not only the minds of the benevolent, but has also had satisfactory realizations of the correctness of the remedial views entertained—namely the taking of weak and sickly school children into the country during the holidays. To this question M. Varrentrap universally known as a scientist and philanthropist has devoted long years of his life, as also to the study of the most important practical questions of hygiene. For some years past M. Varrentrap has been engaged in contriving means for offering to children sanitary aids by removal to the country during their holidays. Children between eight and fourteen years, of parents honest but in poor circumstances who had been educated in the schools of large cities were carried out into the country to the most healthy and agreeable localities that could be chosen, there to spend their holidays, with the object in view of re-establishing their health and strength under hygienic influences. At these places the most satisfactory observations have been made, young girls who up to that time had been brought up to a dread of water in the course of a few days had become delighted with to them this

novel regime. M. Varrentrap entered into the technical and statistical points of the question. The children were weighed and measured on their departure, as they had been on their return home, and as means of comparison the tables of Quetlet were employed. But the investigators did not confine themselves to making on these young children scientific hygienic observations, this agreeable parenthesis in school life had for the children most excellent moral advantages, they became accustomed to order, to cleanliness, to the mending of their own clothes, often in a very bad condition, and from the time of leaving their homes their rude manners gave place to civility and politeness. They learnt to render aid to each other and attached themselves cordially to their teachers who were those they frequently had over them at the schools. In Denmark alone they have thus placed seven thousand children, who remarkable to relate, found a generous and gratuitous hospitality in the country. M. Varrentrap passed in review different countries particularly Berne, the capital of Switzerland. It was to the Pastor Pion, of Zurich, who at that time occupied a pleasant curacy at Trozen to whom the first idea of this philanthropic work occurred, and in 1878 M. Varrentrap inspired at the success of this first attempt applied it on a larger scale, commencing by circulating in immense numbers, pamphlets on the subject, and subsequently holding public meetings. The result has been that twenty-two cities in Germany have imitated this noble example, many in Switzerland, also in the cities of Pesth and Milan. Up to the present the cost of each pupil has been two francs, 50 cents a day, everything included. It is thus that a total in Germany for the last six years of six thousand children have been benefitted by this excellent institution. M. Varrentrap finished his paper by a detail of the physical results obtained and establishes from a physiological point of view an immense augmentation of weight and height which has shown after repeated examinations sometime after the children had been in the country, that there plainly had been a durable benefit. Experiment had even been pushed as far as the measuring of the augmentation of the pulmonary capacity by the spirometer. A delegate from France warmly thanked the illustrious doctor for his instructive communication which France would be glad to imitate.

At five o'clock, at the Hygienic Exhibition, M. Appia demonstrated the objects on view belonging to the Order of the Red Cross. The members of the Congress then visited the hydrotherapeutic establishment of Champel Sur Arve, where a splendid colation and charming concert awaited them. This *fête champêtre* was an agreeable change from the grandeur of the receptions of the two preceding evenings. The whole of the next day was devoted to the excursion in the splendid saloon steamer, the *Mont Blanc*, on Lake Lemman. The luncheon at Evian Les Bains, on the French side of the lake, was a most agreeable interlude to the grand reception that awaited us at the Kursaalat Montreux. M. Verney, President of the Council of State of the Canton de Vaud, welcomed the members of the Congress. Many speeches were made by notabilities from different countries. After the banquet a magnificent illumination of the Gulf of Montreux and Bay of Clarens, extending to Vevay, with festoons of Chinese lamps uninterrupted from Vevay to Villeneuve; churches, hotels and residences up the slopes of the mountain, brilliantly illuminated by strontium and other coloured lights, made altogether an unprecedented and fairy-like scene.

FIFTH SESSION.

FRIDAY, 8th of September.

The Congress assembled at 8 o'clock in the morning, a considerable number of the members assembling to examine the delicate and ingenious spiograph of Dr. Marey, of London, leaving with regret at nine o'clock to attend their various sections. In the first section, General Hygiene, the important question of alcoholism was discussed, occupying all the morning without tiring for a single instant the interest of the auditors. The second section—Public Hygiene—after a long discussion, pronounced in favour of cremation, and afterwards listened to several communications on the mortality of Armies, Barracks and Hospitals.

A large part of the time of the third section was employed in the termination of the discussion of the question of Sewers and Sewerage. The same question was made at

five o'clock p.m., the subject of a conference with Mr. Durand Claye at the Exhibition of Plain Palais. The sitting was terminated by a report from Mr. Colladon on the procedures for rendering tunnels, of great extent and completely shut up from external air during the period of construction, more healthy. Hydrophobia formed the principal subject of discussion of the fourth section, and gave rise to a most animated and interesting debate. The fifth section of Demography or statistics, treated on a number of questions, which, although possibly from a certain point of view less interesting than the preceding ones, were nevertheless of immense importance, as statistics form the basis of true Hygiene.

The afternoon session had in addition to the large number of members daily attracted to it a large number present of persons desirous of hearing M. Paul Bert. This illustrious member of our profession, being invited to take a seat on the platform, was received with prolonged cheering.

Dr. F. Formento, of New Orleans, one of the Vice-presidents of the Congress, was requested to take the Presidential Chair.

At this general meeting held in the afternoon, M. Lombard, the celebrated M. Paul Bert, member of M. Gambetta's cabinet, and M. Marcet, member of the Royal Society, were the principal speakers. Subject of discussion, "Influence of altitude on health." M. Lombard, President of the Congress, entered on it by reading a paper which condensed the work on this subject, that for years he has been engaged in. He distinguished from a hygienic point of view moderate altitudes that is to say from between 500 and 1,000 metres, or 3,000 to 5,000 feet from those that exceed these figures, a difference that has an important influence on health.

At these heights, he states: 1st. Respiration is more frequent and prolonged, especially at the apices of the lungs. 2nd. Circulation more rapid, and as a consequence, the whole surface of the body more coloured. 3rd. Assimilation is more active at the expense of the fat and to the profit of the muscular system. Notwithstanding the diminution of the oxygen by the rarefaction of the air, it evidently results that moderate heights exercise a most beneficial action, and to some extent a regenerative action on all the functions, and in particular do not produce the anæmia, which is the dominating result of very high altitudes; but the question which he considered most important to bring before his scientific audience was the prophylactic and curative influence of moderate altitudes, 500 to 100 metres or 3,000 to 5,000 feet, on the development of Pulmonary Phthisis, from this point of view. The experiences of the speaker gathered in Europe and America are absolutely conclusive. M. Lombard enlarged particularly on the Engadine (Swiss) and especially on Davos, 1,556 metres. These stations have as an essential character a dry air, absence of fog, remarkable clearness of atmosphere, abundance of sun and lowest degree of cold—or 6 of Fahrenheit, which nevertheless the patients bear well. Hundreds of patients have been benefited—one doctor was completely cured at Davos, where he has been settled for 18 years. M. Lombard has auscultated him and has established the cure by pulmonary cicatrices. The Engadine in truth is, as is known, the highest valley in Europe, characterized by conditions now mentioned, and where splendid hotels are to be found for invalids. M. Lombard stated that he could recommend this mountain top with entire confidence. Another analogous sanitary region is to be found on the slopes of the Rocky mountains, in North America, the principal station of which is Denver City, over 3,000 feet altitude.

Here again the climate is characterized by dryness, absence of fog, perfect clearness of atmosphere rarefaction of air which acts preventively in the first inflammatory period of phthisis. As regards the high altitudes, that is to say, those which exceed 2,000 metres or 10,000 feet, there is to be found no sanatorium in Europe, unless in that connection may be named the Hospices of the Grand and Petit Saint Bernard, also that of St. Gothard. But it is in Asia, particularly in the East Indies, that these sanatoria are to be found at similar heights, the highest of which (4,500 metres) on the slopes of the Himalaya, attain nearly that of Mont Blanc, which is 4,800 metres. All these localities present, as is well known, valuable resources for Europeans weakened by the climate of India. M. Lombard also spoke of the Island of Ceylon and of North and South America, both rich in sanatoria, especially with regard to the prophylaxis of tuberculosis.

M. Lombard had charge of a watchmaker, of Neufchatel, threatened with phthisis, who went to Panama from thence to Quito where he obtained a cure, and then returned to Panama where shortly after he relapsed, from thence he proceeded to Arequipa, where he again was apparently cured, and fancied that he could return to his favourite Neufchatel, but again became phthisical and died. The above is merely an epitome of M. Lombard's paper.

M. Paul Bert then, on rising, thanked the audience for their enthusiastic reception, and the President for his excellent paper, and stated that he felt some embarrassment in discharging the work allotted to him. When you are called on to follow a previous speaker it is usually to refute his views. Whilst I am obliged to declare while declining my competence for offering opinions on purely medical subjects that I am fully in accord with the previous speaker. What should I do? I can only address you briefly on the physiological experiments that I have made in my laboratory, in order to solve the difficult problem of the influence of altitudes on the organism. From our experiments especially with the air pump, we have arrived at a solution, I hope, of the questions on which travellers have lost themselves in hypothesis. It was incumbent on me to explain the action of gases on the pulmonary functions and by it on the composition of the blood. The influence of altitudes was then nothing more than a particular case in a general question. It was necessary to commence with the putting aside all mechanical explanations by which there had been attempts at explaining the different actions of altitude on the human body, and in particular to renounce atmospheric pressure, by which it was sought to explain everything, and equally hæmorrhages and all the symptoms of mountain trouble. Well! What did I do? I commenced by submitting myself to a high atmospheric pressure by artificial means, which after the accepted theory, should have crushed me (in fact the physiologist should always commence by the exposure of his own person, it is his duty, his privilege); well, I was not crushed at all. The explanation is simple; there is in the blood oxygen and carbonic acid, united with the colouring matter under the name of hæmoglobine. It has been believed, up to the present, that this union was a chemical combination very intimate, and that as the diminution of atmospheric pressure diminishes, the hæmoglobine progressively abandons the oxygen with which it was united, the blood becomes impoverished, and you enter on a state of asphyxia, and we are now in the presence of symptoms that are observed with the diminution of atmospheric pressure of altitudes.

What conclusion are we to arrive at, if it is not that we have at the same time with the evil found the remedy. When the rarefaction of the air has produced its formidable effects, if my explanation is correct, we have nothing else to do to combat them than to supply the patient with oxygen and he should be cured. In exposing myself and some others of their own free will in a closed chamber with progressive augmentation or exhaustion we have arrived at the mountain trouble, *i.e.* malaise, acceleration of the pulse and of respirations, pain in the head, involuntary tremors, increased sensibility, then deadened sensibility, somnolence and partial loss of reason. Shall I say it? Having counted my pulse for a third of a minute, my consciousness was not sufficient to multiply the number by three, and I had to place on my notes—too difficult. We then commenced respiring from a bag full of air abounding in oxygen; immediately and as by enchantment, all the symptoms ceased, we recovered our senses, the pulsations of the heart became normal, and the respirations less frequent. This was for us an encouraging experience, particularly also from the point of view of the speedy relief that aerial ascensionists can always be provided with.

Two courageous aeronauts made the experiment, when one of the two, becoming of a violet colour with the ears and lips black, had time to place to his mouth the tube of deliverance in connection with a bag full of oxygen, and experienced instant relief. The other experimenter had become absolutely blind, could no longer see his paper, the saving tube restored his sight. In one of the subsequent ascents to the height of 7,300 metres the aeronaut perished in consequence of not having taken a sufficient quantity of oxygen for overcoming the rarefaction of the air. That which we have then said of aeronauts will apply equally to mountain climbers; it suffices for overcoming all the train of symptoms mentioned to carry with them a bag of oxygen gas or the ingredients

necessary for making it. The speaker then endorsed in a few words the statements of Dr. Lombard concerning the therapeutic action of medium altitudes.

He then entered into the question of the physiological process by which persons accustom themselves progressively to live in altitudes which at first appeared quite unsupportable; and especially that the generation following, run perfectly at their ease, where new comers are attacked with all the symptoms just now mentioned, and can with difficulty move. The fact may be explained in different manners. It may be supposed that the acclimatized man has learnt to make a better use of his strength, and that the oxygen insufficient for the new comer suffices for him. Or we may have recourse to the thoracic enlargement which evidently results from a prolonged sojourn at great altitudes, such as the particular mountains in India. The largeness of the lungs of the Indian mountaineers supplies in their case an equivalent for the diminution of oxygen. Perhaps also a more normal harmony has been entered into between nutrition, and by the vital combustion perhaps we consume more, ordinarily, then is requisite. But there is another explanation which appears to me more plausible. It may be that in the case of those Indians who run so easily on the tops of the Himalayas, their blood may in time have become capable of absorbing a larger quantity of oxygen than that of other people.

We have discovered that in the dog in the normal state, one hundred parts ought to contain one of oxygen.

Dr. Gillet, of Bordeaux, has made a singular discovery, viz.: That blood out of the circulation on being shaken can absorb as much again of oxygen. I have succeeded in procuring the blood of the llama and a remarkable circumstance is that it contained more oxygen than in experiments made in lower regions. How then can we conclude otherwise than that the work of acclimatization is any thing else than the blood becoming accustomed to absorb with the same volume a larger quantity of oxygen. Astronomers frighten us much concerning the central fire of our globe which is becoming cooler, and our atmosphere becoming more rarefied. The theory without doubt is accurate, but I have a consolation to offer you—our organisms may during a certain space of time accustom themselves to a rarefied atmosphere because their hæmoglobin will become capable of absorbing a larger quantity of oxygen, notwithstanding the diminution of the atmospheric pressure. I am very glad, gentlemen, to be able to close with this consolation derived from experimental physiology! Prolonged applause.

At the general meeting of Saturday the Prevalence of Blindness was the subject of debate; opening paper read by Dr. Halkenkoff, followed by Dr. Roth. Then came the farewell speeches, votes of thanks, and finally the resolution carried in response to a cordial invitation to hold the next International Sanitary Congress at La Haye (The Hague) in 1884. Communications relating to it, are to be addressed to Dr. VanOverbeck De Meyer, Professor of Hygiene at the University of Utrecht, Holland. The farewell banquet was largely attended. I have of course only attempted a very brief sketch of the interesting proceedings of this Congress, and in conclusion desire to express my thanks for the many courtesies received as the representative of Canada.

C. W. COVERTON,
Delegate.

ARTICLE IV.

REPORT OF THE COMMITTEE APPOINTED TO ATTEND THE SANITARY CONVENTION AT GREENVILLE, TO VISIT THE OFFICES OF THE STATE BOARD OF HEALTH OF MICHIGAN, AND THE HEALTH DEPARTMENTS OF DETROIT AND TOLEDO.

To the Members of the Provincial Board of Health of Ontario:—

GENTLEMEN,—As the result of a conference with the Hon. A. S. Hardy, Provincial Secretary, it was decided that it would be advisable in view of the organization of this

Board that some of its members should attend the Sanitary Convention then about to be held at Greenville, Michigan, on the 11th and 12th of April, and should visit the offices and enquire into the workings of the Board of Health of that State; and the undersigned were appointed as a Committee of your Board for that object.

While travelling towards our destination we were fortunate in making the acquaintance of Dr. H. B. Baker, Secretary of the State Board of Health of Michigan, and his principal assistant, Mr. J. K. Allen, both of Lansing. After our arrival we were introduced by these gentlemen to Dr. Avery, of Greenville, Dr. Hazlewood, of Grand Rapids, Dr. Kellogg, of Battle Creek, and Rev. D. C. Jacokes, of Pontiac, all members of the Board. These gentlemen politely invited us to be present at the regular quarterly meeting of their Board, which was to take place on the morning of the 11th. This invitation was peculiarly acceptable to your Committee, as it gave us an opportunity of familiarizing ourselves with some of the special work of the Board.

The Convention, pursuant to call, assembled in the Congregational Church at two p.m., April 11th, Rev. J. S. Patton acting as Chairman, and Dr. Chas. Sheldon as Secretary. By a reference to the following copy of the programme, it will be seen that these conventions are conducted under the superintendence of a joint Committee of Members of the State Board and of citizens of the place in which the Convention is to be held:—

PROGRAM OF THE SANITARY CONVENTION TO BE HELD AT THE CONGREGATIONAL CHURCH,
GREENVILLE, MICHIGAN, TUESDAY AND WEDNESDAY, APRIL 11TH AND 12TH, 1882.

FIRST SESSION, TUESDAY, April 11th, at 2 p.m.

1. Convention called to order by the Secretary.
2. Prayer. By Rev. Jay Huntington, of Greenville.
3. Address of Welcome. By Hon. Rufus F. Sprague, Mayor of the City.
4. Introductory Remarks; Statement of Purposes of Convention. By John Avery, M.D., Member of State Board of Health.
5. Address: Obstacles to Sanitary Reform. By Rev. J. L. Patton, of Greenville, President of the Convention.
6. A Paper: The Water Supply of Greenville, Present and Prospective. By James Mulhern, M.D., Health Officer of Greenville.
7. Discussion of the Subject.
8. A Paper: The Relation of the Newspaper Press to Sanitary Reform. By E. F. Grabill, Editor of the *Greenville Independent*.
9. Discussion of the Subject.
10. A Paper: Muscular Hygiene. By D. A. McLean, M.D., Health Officer of Stanton.
11. Discussion of the Subject.

SECOND SESSION, TUESDAY EVENING, April 11th, at 7:30.

1. Reading Minutes of Previous Session.
2. A Paper: The Prevention and Restriction of Diphtheria and Scarlet Fever. By Arthur Hazelwood, M.D., of Grand Rapids, Member of the State Board of Health.
3. Discussion of the Subject.
4. A Paper: How Can We Obtain and Preserve the Best Eyesight and Hearing? By Leartus Connor, A.M., M.D., of Detroit.
5. Discussion of the Subject.
6. An Address: Pure Air; Why we should have it, and how we shall get it. By Rev. D. C. Jacokes, D.D., of Pontiac, Member of the State Board of Health.
7. Discussion: Five minute Speeches on the Subject of Ventilation.
8. Appointment of Committee.

THIRD SESSION, WEDNESDAY, April 12th, at 9:30 a.m.

1. Reading of Minutes of Previous Session.
2. Prayer. By Rev. A. A. Brown, of Greenville.

3. A Paper: Effect on Public Health of Overflowed Lands adjacent to Maple River. By S. E. Gillam, M.D., Health Officer of St. John's.
4. Discussion: Five minute Speeches.
5. A Paper: Vaccination—Jenner *versus* Bergh. By Charles M. Martin, M.D., of Greenville.
6. Discussion of the Subject.
7. A Paper: High Pressure *versus* Hygiene in our Public Schools. By Rev. M. W. Fairfield, of Muskegon.
8. Discussion: Five-minute Speeches.
9. A Paper: Food Adulterations. By Prof. A. B. Prescott, M.D., F.C.S., of Ann Arbor.
10. General Discussion.

FOURTH SESSION, WEDNESDAY, April 12th, at 2:30 p.m.

1. Reading of Minutes of Previous Session.
2. A Paper: Prenatal Exhaustion. By Frank K. Owen, M.D., of Ypsilanti.
3. Discussion of the Subject.
4. A Paper: Sewerage of the City of Greenville. By O. G. Fox, of Greenville.
5. Discussion of the Subject—Five-minute Speeches.
6. A Paper: School Hygiene. By Prof. E. P. Church, of Greenville.
7. Discussion of the Subject.
8. A Paper: Meat. By Prof. V. C. Vaughan, M.D., Ph.D., of Ann Arbor.
9. Discussion.

FIFTH SESSION, WEDNESDAY EVENING, April 12th, at 7:30.

1. Reading of Minutes of Previous Session.
2. Prayer. By Rev. E. W. Flower, of Greenville.
3. Miscellaneous Business, Reports of Committees, Resolutions, etc.
4. A Paper: The Disposal of Decomposing Organic Matter. By J. H. Kellogg, M.D., of Battle Creek, Member of the State Board of Health.
5. Discussion of the Subject.
6. A Paper: Relation of the Church to Sanitary Reform. By Lemuel Clute, Esq., of Ionia.
7. Discussion of the Subject.
8. A Paper: The Enforcement of Sanitary Regulations. By Hon H. H. Holt, of Muskegon.
9. General Discussion.
10. Closing of the Convention.

The first three addresses, by Hon. R. F. Sprague, Mayor of Greenville, Dr. John Avery, a member of the State Board of Health, and Rev. J. L. Patton, Chairman of the Convention, did not deal with any special subjects necessary to be reported to you in detail, but were eloquent and effective introductions to the work of the Convention, pointing out its objects, and impressing upon the audience the important bearing which the labours of Sanitarians have or should have upon the well-being of humanity at large.

“THE WATER SUPPLY OF GREENVILLE, PRESENT AND PROSPECTIVE,”

was a topic discussed by Dr. J. Mulhern. Wells are the main sources of water depended upon in Greenville for drinking and cooking purposes. The nature of the soil in this city is gravelly or of a sandy nature, and is favourable for the conveyance of pernicious substances from the surface of the ground to the water of wells. The elements that principally contaminate our water are decomposing vegetables and human and animal excreta, the drainage from which pollutes it and poisons our systems. Many wells are

in proximity to barn-yards, water-closets and privy-vaults; there is no full security in cement wells. The city could be supplied by water from the great springs on the farm of E. B. Edwards east of the railroad station.

The discussion on this subject was protracted and participated in by Drs. Kellogg, Connor, Oldright, Jacokes, Martin, Hazlewood, and Messrs. C. C. Ellsworth, James Satterlee and T. VanHorn. It was affirmed that water from wells is almost universally impure because a well, no matter how carefully curbed, is in fact a reservoir into which poisonous matter may filtrate through any depth of earth; and that poison in cess-pools, privy vaults, or any decaying animal or vegetable matter on the surface of the ground adjacent to the well, is pretty sure to find its way into the water of the well. Numerous cases of poisoning from wells were given in which the water, though apparently pure, was chemically analyzed and its poisonous qualities detected and exposed. The moral is obvious: If you have a well, on the ground about it, or on the ground within a large radius around it, permit no cess-pool, privy vault or any other reservoir of poison which may soak through the ground into the well.

In the discussion on this subject it was pretty generally conceded that two notions often entertained are false and mischievous. First, the widely prevalent notion that the earth will remove all impurities of water which drains through it. Secondly, that filters render bad water comparatively safe. It was stated that filters, especially after being in use a little time, remove only suspended matter and not any of the dissolved impurities or minute germs of disease. After long continued use, without change of contents, they rather deteriorate the water by the decomposing organic matter detained in their meshes. Dr. Oldright referred to an example of this in the so-called "filtering basin" dug in the sand of Toronto Island, which had, after a time, rendered the comparatively pure water of the lake passing through it so impure that the basin had to be abandoned. To be of use filters should be often refilled; and it is good to give them a rest, having more than one, so as to give an opportunity for absorption of air. Sand, gravel, and charcoal were said to be good materials. A large flower pot can be utilized for the purpose.

The question was asked by Dr. Charles S. Sheldon: "How near to cess-pools is it safe to dig wells?" Dr. Jacokes replied: "Most wells will drain a territory of about two hundred yards, some a larger surface. It depends on the character of the soil. By all means do away with the horrible vaults and slop receptacles, which are such breeders of disease. Better carry dish water clear out of town than suffer wells to be contaminated by it." He recommended dry earth closets.

"THE RELATION OF THE NEWSPAPER PRESS TO SANITARY REFORM,"

was a brief paper by E. F. Grabill of the *Greenville Independent*, which gave a few hints how sanitary reformers can best secure and retain hold of public attention. Pungent paragraphs, the speaker remarked, will best secure public attention. People will not read long essays; even if they had the inclination they have not the time. Sanitary theorizing in newspapers is of no avail; people want facts and they will make for themselves deductions sufficiently correct for practical use. Facts inserted with personal interest most readily secure attention—people like to hear about people. Facts published when they are fresh and applicable to some present condition of things are sure to receive attention. Articles should never be expressed in too scientific language, but should always be written in the simplest of words and in the simplest of sentences.

The closing paper of the first session was by Dr. D. A. McLean, of Stanton, on

"MUSCULAR HYGIENE."

The doctor seriously doubted whether the mental labour required of children in our schools is ever so severe as to injure them physically, provided physical culture is carried, as it should be, along with the mental. The great fault of school exercise is that those who need it are just the ones who do not take it, and this is especially true of the girls. Climbing stairs is very injurious to girls in their teens, and yet, if proper

attention were paid to the development of the muscular system, we should hear little of this evil.

Nobody will dispute that a strong, well-developed, robust body is a great desideratum. It is well known that the staying effect, or ability for continued work is directly in proportion to size. Where a well-developed body is not already possessed, it may be secured by regular and persistent muscular exercise, as is witnessed in the training of athletes. By all means let us have more physiology taught in our schools, but let us not forget that it is far better to have physiology *acted*. Ten minutes of vigorous exercise a day is better for children than whole hours spent in the study of physiology. Bodily vigour is a prime necessity. It is coming to be understood that unsound bodies, unsound minds and unsound morals are closely linked together. He could not recommend walking too strongly. Women are very negligent of this health-giving exercise, frequently not going beyond the housedown for days together. He advised daily walks in the open air. The literature of this subject should be studied. He wished he could put into the hands of every man, woman and child in the whole land Dr. Blackie's admirable little book "How to get strong," published by Harper Bros., New York.

"THE PREVENTION AND RESTRICTION OF DIPHTHERIA AND SCARLET FEVER,"

was a very interesting paper by Dr. Hazlewood, of Grand Rapids. He showed by compiled statistics that the death rate of smallpox, compared with diphtheria and scarlet fever, is exceedingly small, although people are afraid of and defend themselves against smallpox, while they take few precautions or none against the introduction of diphtheria and scarlet fever, and make little effort to prevent their spread.

In illustration he gave the following tables of the comparative mortality of smallpox, scarlet fever and diphtheria in three States for five years, ending with the year 1879 :

—	Year.	Small-pox.	Scarlet Fever.	Diphtheria.
MICHIGAN	1875	65	423	207
	1876	76	389	311
	1877	102	404	593
	1878	6	429	877
	1879	6	418	1473
MINNESOTA	1875	0	216	226
	1876	0	316	379
	1877	2	317	370
	1878	7	199	658
	1879	0	225	951
NEW YORK	1875	0	514	329
	1876	0	891	1750
	1877	0	983	951
	1878	0	1099	1207
	1879	0	1477	671

It will be seen from this tabulated statement that mortality from smallpox in this country is trifling in comparison with the annual death rate from scarlet fever and diphtheria. And yet despite such an array of statistics, people are greatly alarmed at the approach of smallpox, while they give but comparatively little attention to the ravages of the latter diseases, and take no active measures looking toward their prevention and restriction. The largest number of deaths from any one disease in Minnesota in 1879 was from diphtheria.

Both diseases are contagious. The speaker cited many examples conclusively proving this. Diphtheria under certain conditions may be readily communicated from person to person, and even from cats to persons. A case of malignant diphtheria is

like a house on fire, the destructive flame must be extinguished as speedily as possible. Scarlet fever is more generally recognized as communicable and probably is so. It may be carried in garments, in milk, and in various other ways. There is danger from scarlet fever patients *so long as there is any peeling of the skin.*

“HOW CAN WE OBTAIN AND PRESERVE THE BEST EYESIGHT AND HEARING?”

was the title of a paper presented by Dr. Leartus Connor of Detroit. He first exhibited a number of large coloured diagrams showing the construction of the eye and ear. Then he followed with a statement of the value of sight and hearing, and advice as to the care of eye and ear. Amongst his recommendations were the following:—Never use the eye or ear when use causes pain in either organ or in the head; do not use the eye for close work before breakfast, or in imperfect light, as in twilight, far from the window on a dark day; keep out of the external ear all instruments; insert nothing larger than the little finger, and put nothing in stiffer than a damp towel or a handkerchief; keep out of the ear all oils, all soaps, all cold water, and everything else that might injure a most delicately constructed and sensitive organ; never put a poultice to the ear unless advised by a surgeon to do so; running ears should at once be attended to by a competent practitioner; bear in mind constantly that we do not see with the eye nor hear with the ear, but with the brain, hence do not lay tasks upon either eye or ear when the brain is in an exhausted state.

Dr. S. E. Gillam, Health Officer of St. John's, read a paper on

“EFFECT ON PUBLIC HEALTH OF OVERFLOWED LANDS ADJACENT TO MAPLE RIVER.”

According to his account Maple River was by nature a healthy stream; it had a good inclination and people along its banks were ordinarily healthful. Thus it was until 1840, when people began to dam the stream. Flats were overflowed on either side to a great distance; the Maple Rapids dam caused the overflow of bottom lands to the extent of two thousand acres or more in low water, the water backing up for a distance of ten miles, making a wreck of a belt of land on either side from one fourth to a mile in width through the townships of Fulton and Washington; and the overflow extends into Elba and Duplain. The river bed, because the current was stopped, became filled with filth and debris from above. Vegetation was entirely destroyed, the surface of the ground, on account of its saturated condition, being of the consistency of thick mush. When fall rains set in lands more distant become overflowed, in which condition they remain until the next spring. The high water flow is estimated at from six thousand to eight thousand acres of valuable land, rendered for several months of each year unfit for use. This might be drained, as a competent survey shows that the fall in Maple River, between Maple Rapids and Bridgeville, is 7.66 feet. Bad River, running into the Saginaw valley, also has its banks overflowed by the dams in Maple River. From observations made by reputable physicians, the overflowed lands have been and are a fruitful source of disease. The miasma emitted therefrom during the summer and fall months causes a large percentage of the sickness of the region. Fever and ague, dysentery, typho-malarial and remittent fevers, pneumonia, rheumatism and neuralgia, as a rule, have always been greater in per cent. and more malignant in type in regions overflowed by this standing water than on higher lands with natural drainage. Diagrams were used to show the relative healthfulness of overflowed lands with the lands not overflowed, the percentage of sickness and death being the test. Numerous reports of health officers read to the convention sustained the position of Dr. Gillam. The paper was of much interest because of its enunciation of principles which may apply equally to all overflowed lands.

“VACCINATION: JENNER VERSUS BERGH,”

was the title of a paper by Dr. C. M. Martin, of Greenville. This excellent paper reviewed the article of Bergh in the *North American Review* for February, in which Bergh takes issue with the experience of mankind and the observations of distinguished

physicians since the introduction of vaccination into use in 1776. Bergh characterizes vaccination as a "hideous monstrosity," and says all sorts of bad things about it. Dr. Martin gave copious statistics to prove his ably sustained position that vaccination is one of the greatest preventatives of disease ever discovered. In the article the views sustained by the best authorities on vaccination were comprehensively stated and light thrown upon some points in regard to it which are matters of daily enquiry among the people. For instance, the question is frequently asked, How often is vaccination necessary? It is answered, that the best evidence is to the effect that to secure perfect protection it should be repeated at intervals of eight to twelve years throughout life. The claim by some that there is great danger of introducing blood diseases into the system was discussed and shown to be fallacious in the vast majority of instances, and Dr. Martin maintained that all danger would be averted if cow pox virus only were used, and that if people would insist that physicians should use no other, there would be no trouble from this source. The value placed upon vaccination by life insurance companies was adverted to. These companies do not ask the question, Have you successfully avoided the contaminating and poisonous operation of vaccination? But, Have you been successfully vaccinated? is the question asked by the medical examiner of the applicant for life insurance—a negative reply being considered sufficient reason to render the risk unsafe and to bar him from the benefits of insurance. The matter of compulsory vaccination was alluded to; while the writer did not advocate it, he gave some excellent reasons in its favour. Its propriety in this country, at least, is an open question. It savours too much of despotism to accord with American ideas of personal liberty.

"HIGH PRESSURE VERSUS HYGIENE IN OUR PUBLIC SCHOOLS,"

by Rev. M. W. Fairfield, of Muskegon, was a strong argument, ably supported by cited facts, showing that the number of studies each student is required to carry at a time is too large; the number of hours of study, in school and out, in order to commit and recite such lessons is too great; ill-ventilated school houses, and school houses with numerous stairs, are destructive of human life. These and other evils call for sanitary reform in the construction of school buildings and in programmes of study.

"FOOD ADULTERATIONS,"

by Professor A. B. Prescott, of Ann Arbor, was a paper which showed that much of food is not what we think it to be. He instanced glucose sugar and grape sugar, oleomargarine, P. D. spices, coffee, terra alba in cream of tartar, etc. He thinks legislation should demand that these things should appear in the markets under their real names or should be prohibited from sale. Dr. Avery related that a package of sugar labelled "pure Michigan maple syrup," sold by a Chicago firm wholesale and retailed in Greenville, analyzed by a competent chemist, was found to be one-eighth maple sugar to seven-eighths corn glucose. Rev. M. W. Fairfield, of Muskegon, made a test of some coffee which he purchased of his grocer, who was positive it was pure coffee, for his wholesale dealer would not, could not, for he was so honourable, sell an adulterated article. Yet Mr. Fairfield showed that grocer, one of the best of his class, that his unadulterated coffee was one-half chicory.

"SEWERAGE OF THE CITY OF GREENVILLE,"

by O. G. Fox, was a paper of great value in statement of facts and in suggestions. It was shown that Greenville is a favourable location for an effective system of sewerage. The best kinds of sewer pipes were described. Every city needing sewerage should devise and plan for it a long time, and not construct at great expense something which it would soon discover was not what it should have.

"PURE AIR: WHY WE SHOULD HAVE IT, AND HOW WE SHOULD GET IT,"

was an interesting and instructive letter by the Rev. D. C. Jackokes, of Pontiac, of the State Board of Health. His advice was how to secure good ventilation in all buildings,

and to keep clean the environment of our dwellings. Learn the facts governing health and then rigidly apply such rules as will secure health. Secure constant circulation of pure air in your dwellings. Be careful to use no wall paper of poisonous colours—better have no wall paper at all. At any rate tear off wall paper from the wall frequently. Beware of impure cellars; do not permit vegetable growth in cellars; white-wash cellar walls at least once a year. Keep your physical system in full vigour so that it will resist the invasion of the infinitesimal disease germ creation that is lying in wait to take possession of and destroy it.

“SCHOOL HYGIENE,”

by Prof. E. P. Church, of Greenville, attracted close attention, especially his allusion to the culpable general neglect of the necessity of having a water closet in the best position and in the best condition to secure the freest possible use thereof by school children. On many school premises one may see a mean, dilapidated building, bearing all possible marks of disrespect and execration, remote from the school house, difficult of approach to sensitive pupils, at all seasons of the year on account of its publicity. In the winter the snow sifts in at numerous crevices; the northern blasts make it a veritable cave of the winds; in winter it is as comfortless as an iceberg; in summer as malodorous as tophet. This description applies chiefly to country school districts. But large towns and cities are culpable in neglecting to supply such water closets and privies as the necessities of health demand, to say nothing of decency. People are doing their children, especially their daughters, great harm in a system of unwise economy. Health is cheap, untidiness and filth are never economical. Our schools should each have a refectory, neat, retired and comfortable.

The first paper of the last session was read by Lemuel Clute, Esq., of Ionia, on

“THE RELATION OF THE CHURCH TO SANITARY REFORM.”

He thought it one of the duties of spiritual advisers to point out among their people the necessity for their attending to the health of their bodies, and to diffuse, when opportunity offers, such sanitary knowledge as they see needed for the welfare of their people. He referred to the abuses of tobacco and alcohol, and the example which Christian people might set in this direction, as well as in certain other respects.

Dr. J. H. Kellogg read a lengthy and important paper on

“THE DESTRUCTION OF DECOMPOSING ORGANIC MATTER.”

Noxious gases and disease germs are usually associated together. Disease germs may be present without any perceptible odour, but the converse is never true. The settler in a new country usually digs two holes in his yard; into one goes all the filth of the family, from the other comes the water they drink. Usually these holes are near each other and their contents mingle. In older countries he digs one hole for the water and two or three for his filth, the latter frequently surrounding the former. Do away with cess-pools, vaults, and similar sources of disease, and you will reduce diphtheria, scarlet fever, typhoid fever, etc., *two-thirds*. The doctor spoke at length of many sources of disease within the house, as neglected cellars, pantries, wood-boxes, carpets, wall-papers, the kitchen, sink, etc.

Decomposing saw-dust is a fertile source of disease. It is believed that the recent epidemic of diphtheria at Ludington, Mason county, originated in this way. Nearly every child in the city suffered the disease, and one-third of the children died.

The importance of the proper disposal of human excreta was next dwelt upon; and the use of dry earth in some form of closet or other contrivance. The disinfection of excreta, especially of patients suffering from infectious disease, was referred to. Experiments were performed showing the disinfecting qualities of copperas, potassium permanganate, etc. The faulty methods in which some disinfectants, such as chloride of lime, are used, was alluded to.

The speaker remarked that the great sanitary requisite was co-operation, and the chief obstacle is the apathy of the people. “Thou art thy brother’s keeper” is strictly

true in a sanitary sense. A man may obey sanitary injunctions, but if his neighbours are negligent, his care may be all in vain, and the life and health of his family in as great jeopardy as they would be from his own neglect.

An interesting feature to the general audience in connection with this paper was the illustration on a screen, by means of a lantern, of bacteria and other minute forms of life.

The closing paper of the convention was by Hon. Henry H. Holt, of Muskegon, on

"ENFORCEMENT OF SANITARY REGULATIONS."

It was valuable as showing how the importance of sanitary regulations is appreciated by an increasing number of prominent men not members of the medical profession, and the views they entertain as to the "liberty of the individual" to spread death and destruction among his fellow beings.

The members of your committee were asked to address the convention on some subject of sanitation, and in response one of us made some remarks on a subject connected with drainage, but as it is hoped that members of this Board will from time to time have opportunities of interchanging views with one another on this and other subjects, it is not necessary to occupy your time with a report of what was said by us.

We were most cordially invited to take part in the various discussions, and we embraced the opportunity to express at the same time our appreciation of the valuable labours of the Michigan Board; a sentiment in which we feel assured you will join with us.

A committee appointed by the chairman reported on the sanitary appliances exhibited, and another committee on general resolutions regarding a number of sanitary matters, the conduct of future conventions, etc. In connection with these Governor Jerome, Bishop Gillespie, Hon. H. H. Holt, and other gentlemen of influence, added to the importance and interest of the proceedings.

The value of such conventions in enlisting the sympathy and interest of the people, as well as in imparting information, is a fact so self apparent as to lead your Committee to recommend the holding of such meetings in various parts of this Province.

As already intimated your Committee was by invitation present at the

QUARTERLY MEETING OF THE STATE BOARD.

Certain subjects were discussed which will be of interest to you. One of these was the establishment of a system of Immigrant Inspection, and the adoption of means for preventing the spread of disease by means of immigrants. In this, it is the intention of the Board to seek the co-operation of other States and of the Health authorities of Canada and its various Provinces. Another was the preparation of a circular for general distribution directing people what to do whilst "waiting for the doctor—cases of poisoning." A report was also presented on the Manx feeding-bottle, which has a leaden sinker covered with rubber, and which has caused lead poisoning amongst infants, and it was recommended that the maker be asked to remedy the defect.

A circular to Health Officers was considered and adopted.

Delegates were appointed to the meetings of the American Medical Association, the American Public Health Association, and others. The other matters before the Board at this meeting were chiefly of a routine character.

Your Committee returned to Lansing, in company with Dr. Baker, Mr. Allen and Professor Prescott, of Ann Arbor, and were invited to accompany these gentlemen to the

AGRICULTURAL COLLEGE.

They had the pleasure of inspecting the Museum, Conservatories and Laboratories of that institution. The Chemical Laboratory of Professor Kedzie is very well and conveniently arranged. It is also provided with a large number of instruments, illustrations of the branches of Chemical Physics, more especially of electricity and magnetism.

Your Committee next proceeded to the

OFFICES OF THE STATE BOARD OF HEALTH OF MICHIGAN,

when the Secretary, Dr. H. B. Baker, and his chief Clerk, J. H. Allen, very kindly spent portions of two days in explaining to us the documents connected with the workings of the Board, and discussing many matters connected therewith. Dr. Nicholson also explained to us the method of compiling the weekly Disease Reports.

As the Secretary was good enough to furnish us with a copy of his late Report for each member of this Board, it will not be necessary for your Committee to go so fully into detail as it otherwise would.

Your Committee has also been supplied with copies of all the blank sheets, blank forms, circulars and other documents of the Board, and a classified list of these will be found appended to this Report.

The information obtained by an organized system within the State is mainly derived from three sources:—From the regular correspondents of the Board, from Health officers and other local authorities, and from reporters of disease. In addition to this, the law provides that the medical and other officers of mining companies, or of any other organized companies in the State, shall furnish to the State Board any information bearing upon public health. The third class above referred to is made up from the others; all Health Officers of cities (and these are medical practitioners) are required to send Disease Reports, and very many of the correspondents volunteer to do so. In this connection it must be stated that in Michigan the population required to make a city is not half that required in Ontario, and hence cities are very numerous. So that between volunteers and Health officers of cities a good staff of reporters is secured.

In addition to the weekly reports of diseases sent by Health officers of cities, all Health officers and Clerks of Local Boards of Health are required to report annually; and also to report from time to time cases of contagious diseases, and to report on any other matter of importance or interest—in connection with Public Health.

From the above it will be seen that the Health officers constitute an important factor in advancing science sanitary, as well as in imparting the benefits derived from the study and practical application of it.

And your Committee would recommend that strenuous efforts be made to secure the appointment by each municipality in Ontario, of a regularly organized Local Board of Health, with its Health officer, a medical man when practicable. This is the law in Michigan. In every municipality the Board must appoint a Health officer, and if a medical man is available the Health officer must be a medical man.

The correspondents are medical men of good standing and ability in various portions of the State, who are invited by the Board to fill the position, and, if they accept, are invested by a formal commission of the Board with the above title. Their functions are to report regarding anything in their respective districts that may have any bearing upon Public Health, or be of interest to the Board; the occurrence and causes of epidemics or endemics; meteorological, topographical, social, commercial, or other conditions affecting health. There are two subjects coming under the above enumeration on which most of them report regularly at stated periods. As before intimated most of them are included in the list of Weekly Reporters of Diseases; and about thirty of them are Regular Meteorological Observers, sending monthly reports of facts relating to temperature, humidity, barometric pressure, clouds, winds, rains, snow and ozone. The observations on which these reports are based are made three times a day (at 7 a.m., 2 p.m. and 9 p.m.), sometimes I suppose by some intelligent person as Deputy. The work of the correspondents and observers is done gratuitously, as is, I believe, the work of the observers connected with the meteorological service of Canada in outlying stations.

Our Board is fortunate in having the performance of this part of the work provided for, Mr. Carpmel, Superintendent of this Service, having kindly promised the Chairman to co-operate with the Board and furnish us with such information as we shall need. The plan for collecting disease reports is somewhat similar to that with which most of the members of this Board are familiar as having been adopted by Mr. T. H. Monk, of Toronto, in the system carried on by him for a short period. The blanks for the weekly reports are printed on postal cards, which are distributed to the observers before referred to. A supposititious sample of one of these is here appended, and will explain itself:

DISEASES IN *Grand Rapids*, WEEK ENDING SATURDAY, 15TH APRIL, 1882.

No.		Prevalence. Order. See <i>a</i> .	Severity. See <i>b</i> .	Cases.
Ed. 18.	Brain, Inflammation of			0
	Bowels, Inflammation of	6	+	2
	Bronchitis	3	-	5
	Cerebro-spinal Meningitis			0
	Cholera Infantum	7	=	1
	Cholera Morbus			0
	Consumption, Pulmonary	7	=	1
	Croup, Membranous	5	-	3
	Diphtheria	7	-	1
	Diarrhoea	6	=	2
	Dysentery	6	=	2
	Erysipelas			0
	Fever, Intermittent	1	=	8
	Fever, Remittent	6	+	2
	Fever, Typhoid (Enteric)	2	+	6
	Fever, Typho-malarial	5	+	3
	Influenza	6	-	2
	Measles ..	6	-	2
	Neuralgia	6	=	2
	Pneumonia	5	-	3
	Puerperal Fever			0
	Rheumatism	4	=	4
	Scarlatina	6	-	2
	Small-pox			0
	Tonsilitis	7	-	1
	Whooping-cough	5	-	3
	[Others may be added.]			

a. Please mark the disease of which there is the greatest number of cases, 1; the disease having next greatest number of cases, 2; the next, 3; and so on for each disease, writing the same figures opposite diseases having the same number of cases. Write 0 opposite diseases not present. [For entire plan, see "Printed Letter Stating Plan," pages 240-7, Annual Report of S. B. of H. for 1877.] A blank indicates that the item has been overlooked.

b. The sign = indicates the usual severity, + indicates more, - indicates less than the usual severity. Please mail this, signed and dated, as soon as convenient after close of week specified.

M.D.

The reverse side of this card bears the printed address of the Secretary.

The compiler, Dr. A. H. Nicholson, has a ruled sheet containing the list of diseases and spaces in which to record the names of places reporting, under which he enters the figures of the various diseases reported.

These figures are wrought out to supply the information summarized under the following schedule:--

188...	FOR WEEK ENDING.....						Per cent. of Observers, week ending	More (+) Less (-) than for week ending
	Total order where present.	Average order where present.	Order of Area of Prevalence.	Number and per cent. of Observers re- porting each Disease.				
				Num- ber.	Per cent.			
Brain, inflammation of.....								
Bowels, inflammation of								
Bronchitis								
Cerebro-spinal Meningitis								
Cholera Infantum								
Cholera Morbus								
Consumption, Pulmonary								
Croup, Membranous								
Diphtheria								
Diarrhœa								
Dysentery								
Erysipelas								
Fever, Intermittent								
Fever, Remittent								
Fever, Typhoid (Enteric)								
Fever, Typho-malarial								
Influenza								
Measles								
Neuralgia								
Pneumonia								
Puerperal Fever								
Rheumatism								
Scarlatina								
Small-pox								
Tonsilitis								
Whooping-cough								
.....								

Of the four contagious diseases, diphtheria, measles, scarlet fever and smallpox, a separate record is kept of the total number of places reporting them, and of the number reported by regular observers. The difference arises, we presume, from the fact that *all* Health officers are required to report the outbreak or occurrence of contagious diseases.

Every week a bulletin based upon these reports and calculations is published, a number of printograph copies being sent to certain newspapers, and other copies being struck off in print and distributed by the Board. The following is a copy of the bulletin for the week preceding our visit:

"HEALTH IN MICHIGAN.

[Bulletin 27.]

"Reports to the State Board of Health, Lansing, by 51 observers of diseases at different parts of the State, show causes of sickness during the week ending April 1 1882, as follows:—

DISEASES, IN ORDER OF GREATEST AREA OF PREVALENCE.		Number and per cent. of Observers by whom each Disease was reported.	
		Number.	Per cent.
1	Neuralgia	39	76
2	Rheumatism	37	72
3	Bronchitis	36	71
4	Intermittent Fever	35	69
5	Consumption, of Lungs	28	55
6	Pneumonia	27	53
7	Influenza	26	51
8	Tonsilitis	21	41
9	Remittent Fever	17	33
10	Diphtheria	13	25
11	Whooping-cough	10	20
12	Typho-malarial Fever	10	20
13	Diarrhœa	10	20
14	Inflammation of Bowels	9	18
15	Erysipelas	9	18
16	Measles	8	16
17	Scarlet Fever	6	12
18	Mumps	5	10
19	Typhoid Fever (Enteric)	5	10
20	Cerebro-spinal Meningitis	5	10
21	Membranous Croup	3	6
22	Cholera Morbus	3	6
23	Inflammation of Brain	2	4
24	Smallpox	2	4
25	Pharyngitis	2	4
26	Gastritis	2	4
27	Puerperal Fever	2	4
28	Dysentery	2	4

"Besides those tabulated above, the following named diseases were reported each by one regular observer: Cholera, infantum, spinal meningitis, laryngitis, chorea, hysteria, paralysis, spasmodic croup, and peritonitis.

"For the week ending April 1, 1882, the reports indicate that rheumatism, inflammation of bowels and neuralgia increased, and that diarrhœa, scarlet fever, tonsilitis, consumptions of lungs, membranous croup decreased in area of prevalence.

"While seven diseases increased, seventeen decreased in area of prevalence, the average increase and decrease being by about the same per cent. of observers, so that the decrease was apparently more than double the increase in sickness.

"At the State Capitol, the prevailing winds were southwest; the average temperature was greater, the average absolute humidity and average day ozone, were slightly more, the average relative humidity and the average night ozone were slightly less, during the week ending April 1, than during the preceding week.

"Including reports by regular observers and by others, diphtheria was reported present during the week ending April 1, and since, at 17 places; scarlet fever at 7 places, measles at 7 places, and smallpox at 6 places in all, as follows: in Everett township, Newaygo county (3 cases), and at Grand Rapids, March 28; at Milford (4 new cases), March 30, and one new case reported April 5; in Geneva, Van Buren county, at Battle Creek (2 new cases), and at Detroit (2 cases), April 1, 1882.

"HENRY B. BAKER,
Secretary."

"LANSING, Mich., April 7, 1882.

An examination of the foregoing documents will suffice to show the nature of the facts reported and of the deductions made each week from them. In the annual report the diseases from various divisions of the State are arranged in such a manner that comparison may be instituted. A comparison of meteorological conditions is also made.

Your Committee does not consider that it need dwell more minutely on the plans of the Michigan disease reports, especially as they, amongst other things, may be more fully discussed when you take into consideration a system of disease reports for this Province. Nor will it be necessary in addressing the members of the Board to debate upon the nature and value of the studies to be made of these reports, nor of the importance of the inferences to be drawn from them. We may, however, state that we were very much interested in the diagrams of various kinds arranged in the same way as the diagrams of mortality in the Registrar-General's reports of this Province. Some of the most interesting are those showing synchronous tracings of diseases and meteorological conditions, as for example tracings of temperature, with the diarrhoea curve bearing a direct, and the pneumonia curve an inverse, ratio. The reverse being in a general way true of the ozone curve.

The nature of the meteorological reports may be gathered from an examination of the contents of the Report Blank No. 3, class C. of the appended list of documents from Michigan.

In the subject of vital statistics nothing which could be of service to this Board presented itself to your Committee, except that the Death Certificate gives more particulars than ours. It is a curious fact that the law of Michigan has no clause to compel registration of births. The only way of obtaining birth statistics is by the assessor once a year collecting from the memories of such people as have not moved away from the State, the particulars of the births that have taken place during the preceding year.

The titles of the other documents in the appended list will briefly indicate much of the work of the Board and are self-explanatory. Many of them are of interest merely as indicating how the work of the Secretary is systematized and how it may be lightened by the use of various forms, blanks, printed instructions and record books. In connection with the set of printed envelopes addressed to persons with whom there is frequent communication, your Committee would draw attention to a piece of office furniture by which much labour is saved. This was a secretary-desk in the face of which were slits with thumb holes for the withdrawal of one envelope at a time, the place of this being immediately taken by another. The pigeon holes were fed from the back, a door closing them all in.

The following is the list of documents furnished us from the Secretary's office:—

DOCUMENTS OF MICHIGAN BOARD OF HEALTH.

A.—BLANK FORMS OF VITAL STATISTICS.

- | | | | |
|----|---|---|-----------------------------------|
| I. | { | 1. Return of Births to Secretary of State. | |
| | | 2. " Marriages " " | |
| | | 3. " Deaths " " | |
| | | 4. List of names of children whose Christian names were not previously given. | |
| I | { | 5. Return of Births in County Clerk's Office. | } Made by Supervisor or Assessor. |
| | | 6. " Deaths " " " | |
| | | 7. " a marriage to County Clerk's Office, made by Clergyman or [Magistrate. | |

B.—BLANK FORMS OF REPORTS OF DISEASES TO BOARD. (*Vide supra.*)

1. Form of cards illustrating manner of reporting.
2. Ruled blanks for the weekly compilation of the reports from different places:—
 - (a) Of the number of cases of various contagious diseases from different places.

- (b) Of the amounts of various diseases from different places, with a compilation in the following series of columns :—(1) Total order where present ; (2) Average order where present ; (3) Blank space ; (4) Order of area of prevalence ; (5) Number of observers reporting ; (6) Percentage of reporters ; (7) Per cent. of observers for week ending [preceding week] ; (8) more [observers] (+), less (−) than for week ending [These sheets are supplied with gummed slips, movable, so as to adapt them to the number of places reporting.]

- (c) The above particulars are copied into a book composed of similar sheets bound together.

3. Bulletin issued from State Office weekly (printed).
4. Number of copies of Bulletin to newspapers (per gelatine pad.)
5. Record of Weekly Reports of diseases for the year received at the State Office from Health Officers of cities and Regular Correspondents.
6. Record of diseases dangerous to public health occurring in city of — , Michigan, giving record, number, date, name of patient, sex, age, disease, when taken ill, whether dead, living, recovered.
7. Observer's Blank Book of Forms.

C.—OFFICIAL CORRESPONDENTS.

1. Circular asking acceptance of position by correspondents (with circular taken from Report 1873).
2. Circular to correspondents relative to diseases in Michigan (asking for replies).
3. Report of monthly Meteorological Observations :—
 - (a) Name and address of Observer,
 - (b) Latitude,
 - (c) Longitude,
 - (d) Height of ground above sea-level,
 - (e) Height of surface of mercury in cistern of Barometer above sea-level.
 - (f) Daily Observations :—
 - (1) Thermometer ; (2) Hygrometer ; (3) Relative Humidity ; (4) Absolute Humidity ; (5) Pressure of Vapour ; (6) Barometer ; (7) Clouds ; (8) Winds [direction and velocity] ; (9) Ozone ; (10) Maximum Thermometer ; (11) Minimum Thermometer ; (12) Rain and Snow, beginning, ending, and amount.
4. Form of Weekly [Weather] Reports throughout the year, made from Reports of correspondents sent to the State Board of Health.

D.—CIRCULARS TO SUNDRY PERSONS.

1. (a), (b). Circulars to regular correspondents of Board.
2. Circulars to Observers.
3. “ to Health Officers of Townships.
4. “ “ of Cities and Villages.
5. “ to County Clerk.
6. “ to Supervisors and Assessors.

E.—ADVICE TO HEALTH OFFICERS AND BOARDS.

1. To Health Officers of Cities.
2. “ “ “ Townships.

F.—RECORDS CONCERNING CONTAGIOUS DISEASES.

1. Records of cases which have occurred in County of — .
2. Record to Secretary of Board of cases dangerous to Public Health (occurring in) — .
3. Notices to Householders and Physicians concerning contagious diseases.

G.—RECORDS OF VARIOUS BOARD EXPENDITURES AND DISPOSAL OF PROPERTY.

1. Record of Books loaned from Board of Health Library.
2. " of Issues of Stationery, Forms, Instruments, etc., to, and Acceptance or Performances of Duty by, Correspondents, Observers, Health Officers, etc.
3. Record of distribution of Reports, Circulars, etc., from the office of the Board.
4. Index to names in distribution of Books, Forms, etc.
5. Classified Expense Account of the Board of Health, Michigan.

H.—MISCELLANEOUS REPORTS, PAMPHLETS, ETC.

1. Receipt for Blanks.
2. Contract prices for printing, binding, etc. [by State printer].
3. Law relating to the establishment of the Michigan State Board of Health.
4. Additional Public Health Laws (1879).
5. Meteorological Post-cards, etc ; (1) General ; (2) Correspondence Cards ; (3) Answer.
6. Labels going with consignments of Books, etc.
7. Form acknowledging receipt of Letter.
8. Complete set of Envelopes with printed address.

HEALTH DEPARTMENT OF TOLEDO.

One of the members of your Committee having seen it reported that a Mayor of Toledo, Ohio, a medical man, had introduced certain sanitary improvements which had changed it from an unhealthy, to a very healthy, city, your Committee took advantage of its proximity to their route of travel and visited it. We arrived in the evening, and shortly afterwards the Health Officer, Dr. Ridenour, to whom we had telegraphed, called upon us. We found that he and one of the ex-Mayors, Dr. Jones, had kindly arranged that we should attend a meeting of the Medical Society, which was to be held at the house of the latter gentleman that evening. After the meeting Dr. Jones very hospitably entertained our Committee, and the gentlemen present gave us an opportunity for discussing matters connected with our mission. They did not claim for Toledo any very extensive or complete sanitary organization. Dr. Jones thought the Report had arisen from the fact that some years ago they had in the neighbourhood of Toledo large gangs of navvies engaged in digging the canal. Their habits were very uncleanly, and fever broke out and carried off many of them. Since their departure Toledo had resumed its usual condition of health, which the doctor claimed as being above the average. The yearly extension of drainage has also much lessened malaria in the city. The principal points in the sanitary system of Toledo are that the city is kept clean by a well ordered scavenger system, with frequent systematized emptying and disinfection of latrines, and that there is a sharp look out for infectious diseases, and a free use of disinfective measures. Nuisances are dealt with by the Sanitary Police, and the Police force, generally, report to the Health Officer and carry out his instructions. There are also district physicians, who look after the very poor sick of their respective districts.

A copy of the Annual Report of the Board of Health of Toledo is herewith presented to our Board. Your Committee is glad to see strongly urged in it the passage of a By-law requiring a vent pipe to be run from the house drain up above the roof of every house, so as to carry off sewer gas over head at a safe distance from pedestrians and inmates of the house—a plan advised by sanitary writers, and repeatedly advocated by the Chairman of this Board. The advantages of subsoil drainage of the sites of houses are also set forth in the Report.

HEALTH SYSTEM OF DETROIT.

Both in Lansing and in Toledo, Detroit was referred to as having a very perfect health system, and thither we accordingly bent our steps on the next morning. The Health Board of Detroit has recently been established by a special Act of the Legislature. We were sorry to find that the Health Officer, Dr. O. W. Wright, had been summoned to Chicago to attend a conference regarding the serious epidemic of smallpox in that city. The workings of the department were, however, fully explained by his assistants, E. W. Allmadge, Esq., and Dr. Rowley. Your Committee also met with a very courteous reception at the hands of Dr. D. O. Farrand, President of the Board. The

MORTUARY RECORD

Detroit is very well kept, and is of great value, not only in connection with public health, but also from a legal standpoint. In a series of bound volumes are recorded the particulars contained in the following certificate; and it will be seen that these particulars are very full and numerous, affording a great deal of information valuable both to the hygienist and to the lawyer. The index to these volumes is arranged (to save time and labour) on the "three letter combination" plan.

Observe note on margin.

Office in Central Market Building.

CERTIFICATE OF DEATH.		No.....
For the month of..... In the City of Detroit, Mich.		
1. Name	Colour	
2. Sex	Married.....	Single
3. Age		
4. Name of father of deceased	Nativity	
5. Name of mother of deceased	Nativity	
6. Occupation of deceased		
7. Place of birth of deceased (town, county, State).....		
8. Name of wife of deceased		
9. Name of husband of deceased		
10. Date of birth.....	Date of death.....	
11. Cause of death.....		
12. Duration of disease		
13. Place of death	Street.....	Ward
14. Place of burial.....		
15. Undertaker.....		
Residence of physician.....		
Detroit.....	188...	M.D.,
Burial Permit No..... Dated..... 188... To be buried..... 188... <div style="text-align: right;"><i>Attending Physician.</i></div>		

No Burial Permit will be issued upon this Certificate unless correctly filled out, signed and returned to the attending physician or coroner.

Very great care and vigilance are exercised to secure the return of every death. The medical attendant is required to send in the above certificate within twenty-four hours. No dead body can be removed from the house in which it lies without a permit from the Health Office, and this rule is most strictly enforced, as your Committee can testify from an interview which took place between the deputy health officer and an undertaker on the day of our visit, from which it could be gathered plainly that the undertakers know the law, and that they had to respect it. The superintendents of cemeteries are also required, as with us, to see that the law is complied with.

The precautions adopted and carried out by the Health Department of Detroit for

PREVENTING THE SPREAD OF THE MORE VIRULENT CONTAGIOUS DISEASES,

very thorough and effective. Physicians are furnished with postal cards (for profes-

sional reasons your Committee would prefer blanks not so exposed to public gaze or carriers, etc.), on the backs of which is the following blank :—

REPORT OF INFECTIOUS DISEASES.

Date188...

Name of patient in full

Age of patient

No. and street, exact

Name of disease

Place where children from that house attend school

Signature of physician.....M.D.

N.B.—The law requires every case, whether in same family or not, to be reported forthwith, in writing, with age, name and locality, under maximum penalty of \$500. Send or mail this card promptly to Health Office.

When this card is returned by the Health Officer, its contents are registered in a book made for the purpose, and the following printed notice is sent to the sergeant of Sanitary Police.

OFFICE OF THE BOARD OF HEALTH,
Detroit.....188...

To the Sanitary Police.

You are hereby directed to placard house No. Street,
for.....in the family of....., to leave
with the family the enclosed circular,* and to make returns herewith to this office.
By order of the Board of Health.

.....M.D.,
Health Officer

The blank is returned by the sanitary police with a declaration that the order has been carried out, and it is then filed with all the other cards and papers connected with the case.

The placards are large cards—11 × 14 inches—red for scarlet fever, yellow for smallpox, blue for diphtheria, with the name of the disease in large letters, and the following warning in English and German: “\$500 fine for removing this placard without authority from the Board of Health. If removed, occupant of house must report to the Health Office within twenty-four hours under the same penalty.”

If it be deemed necessary a sanitary inspection of the premises is made and any objectionable condition removed, such as may be caused by manure heaps, filthy vaults, defective drainage or plumbing, polluted wells, foul cisterns, want of drainage for wet cellars or low grounds, etc.

The greatest care is taken not to interfere in any way “by word, act, or look with the practice of the attending physicians.” The notice to the Inspector and his return are both placed on file as before.

Notice is sent to the schools where the children of the family attend, if it be dangerous for them to continue to do so.

When the case ends (whether in recovery or death) a card similar to the following is sent in by the attending physician :—

REPORT OF RECOVERY FROM INFECTIOUS DISEASES.

Date188...

Name of patient in full

No. and Street, exact

From what disease recovered

How long sick

Signature of physician.....

N.B.—Placard will remain on house at least four weeks, unless attending physician reports recovery earlier. ~~Send~~ Send or mail this card to Health Office.

* The circular above referred to is a pamphlet on the means to be used to prevent the spread of the disease.

Thereupon the following order is given to a competent officer, sometimes a junior medical practitioner, who has been instructed in the work :—

OFFICE OF THE BOARD OF HEALTH,
Detroit.....188...

To.....

You are hereby directed to disinfect House No.....street,
in the family of.....where a
case of.....has terminated by.....
to deliver to the family the enclosed certificate, and to report herewith to this office.

By order of the Board of Health.

O. W. WIGHT,
Health Officer.

The disinfection performed, the officer removes the placards, and hands to the family the following certificate :—

OFFICE OF THE BOARD OF HEALTH,
Office in Central Market Building,
Detroit.....188...

It is hereby certified thatWard,
of.....street,
has recovered from.....

The house has been disinfected, and the inmates may again have the privilege of schools, library, etc., with safety to the public health ; but follow school regulations.

Placards can be removed from houses only by an officer from this department, or by a written permit from the Health Officer.

By order of the Board of Health.

N.B.—Show this certificate to principals of schools, librarian, etc.

O. W. WIGHT,
Health Officer.

He then makes his returns and these papers are filed with the others, and all are placed away, making a complete history, which can at any time be referred to if needed.

They are all noted in a sort of diary form from time to time in a book called the Infectious Disease Register, from which I give a leaf with suppositious names. Supposing at any time we want to refer to the case of James Stephens, who had diphtheria, we look in the “ Three Letter Combination Index” under “STE,” and we find :—

SURNAME.	CHRISTIAN NAME.	DISEASE.	PAGES.		RESIDENCE, ETC.
Stephens	James	D.....	71	221	18 Union Street.

We turn up pages 71 and 221 of the Infectious Disease Register and read as follows :—

1882.
April 8.—James Stephens ; 18 Union Street ; age 20 ; diphtheria ; reported by Dr. J. N. Thompson.
“ 9.—Ordered to placard.
“ 10.—House placarded.
“ 14.—Recovered.
“ 15.—Ordered to disinfect.
“ 16.—House disinfected.

When death occurs the undertaker is instructed not to have a funeral in a church or other public place and not to open the coffin ; and the endeavour is made to persuade the friends to have the funeral as private as possible, and not to allow very young persons to act as pall bearers or come into close proximity with the corpse.

The great benefits from such a system as the above must be apparent to all intelligent persons who understand the nature of such diseases as smallpox, scarlet fever, and diphtheria. And there is no doubt that after a time they will be so appreciated that all

crotchety notions about "personal liberty," "violations of personal confidence," and the like will give way before them.*

In regard to

NUISANCES,

the system of the Board seems very efficient, but does not differ materially from that in other places. Blanks are in existence on which persons record complaints. An Inspector then investigates. If the complaint be sustained a notice is sent to the owner requiring him to remedy the nuisance. Sometimes he is asked to come to the office, and the matter is discussed. Printed forms for all these purposes exist.

Amongst nuisances on a large scale which have attracted the attention of the Board, have been slaughter houses, a glucose factory, and the smoke from manufactories. To remedy some of these, further legislation of an obvious character has been recommended, as also for the regulation of the milk supply, of the ice supply, and of the plumbing and draining of the city.

Before returning home your Committee went over to

WINDSOR,

and were glad to find there a very efficient Board of Health. We had interviews with Dr. Coventry, Mayor, and Chairman of the Board, and with Dr. Carney, also a member of the Board. The same effective action with regard to contagious diseases which exists in Detroit, is also carried out in Windsor.

Your Committee cannot close this report without

EXPRESSING THEIR OBLIGATIONS

to Dr. H. B. Baker, Dr. Avery, Rev. Dr. Jacokes, Dr. Hazlewood, Dr. Kellog, and other members of the State Board of Health of Michigan; to Prof. Kedzie, a late member of the Board, and Professor at the Agricultural College; to John K. Allen, Esq., Dr. A. W. Nicholson and other gentlemen in the Secretary's Office; to Dr. Sheldon, of Greenville; to Drs. Jones and Ridenour, of Toledo; and to Dr. Farrand, Dr. O. W. Wight, E. W. Tallmadge, Esq., and Dr. Rowley, of Detroit; and to others mentioned in this Report.

All of which is respectfully submitted.

WM. OLDRIGHT.
J. J. CASSIDY.

REMARKS ON THE PLANS CARRIED OUT IN DETROIT TO PREVENT SPREAD OF INFECTIOUS DISEASES.

DR. O. W. WIGHT.

(Referred to in the foot note.)

Such are the elaborate measures taken to restrict the spread of infectious diseases, which in our great centres of population perpetually gather a rich harvest of victims. The labour is great, but I have no doubt that the results, if they could be accurately measured, would astonish the most thoughtful citizen.

The advantages of the system may be briefly stated:—

1. It enables the Health Department, and the public through the Health Department, to know every day in the year the exact number of cases of infectious diseases in the city and their precise location. Rumour and *sensational exaggeration* in regard to the

* Since the time of presenting this Report, the First Annual Report of the Health Office of Detroit has been published. It contains an article on this subject, a portion of which is printed on this and the next two pages. In it will be found some very forcible sentences.

prevalence of contagious maladies, which are liable to alarm the people needlessly and to *interfere with the pursuits of life, can then be corrected by facts*. And the truth of a violent epidemic cannot be suppressed in the interest of commerce to the criminal endangering of the outside world.

2. The exact percentage of mortality is constantly known, revealing the severity or mildness of an epidemic.

3. The system affords especial means of studying the conditions under which contagious diseases flourish, or to what extent they are influenced by sanitary surroundings.

4. It diminishes the spread of contagious diseases by protecting large congregations of children in schools from the presence of those bearing infection in their persons or clothes; by preventing exposure of the living at public funerals; by revealing to all who can see and read the places where such diseases may be caught, and by destroying the lingering germs of contagion in sick rooms by means of thorough disinfection. My experience convinces me that a community will give a wide berth to smallpox, scarlet fever or diphtheria if you will only let them know where it is. I have frequently seen quite small children cross over to the other side of the street when approaching a house on the door of which was placed a placard revealing the existence of contagious disease within. *It is wicked to conceal from God's little ones the fountains of infectious suffering and death.*

The difficulties of carrying out the system are considerable, but not insuperable:—

1. When the majority of educated physicians are ready to co-operate with the health authority in carrying out any reasonable system of protecting the public from contagious diseases, the negligence of many and the perversity of a few must be overcome by the unflinching execution of the law. To the credit of the profession in Detroit it must be said that no one has raised the question of fees for reporting contagious diseases to the Health Office. An unseemly discussion of that question is now going on in Great Britain. The medical practitioner depends upon the patronage of the public, and should be willing to do for the public at large a service that costs very little time and trouble, and is attended with no expense. The necessity of reporting to the Health Office all deaths, with the causes, in order to get a permit to bury, puts the doctor on his good behaviour. A few attempts to return croup for diphtheria, spotted fever for scarlatina, etc., have been met with an order for a coronor's inquest.* Inability to make a diagnosis has sometimes been urged as an excuse by delinquent quacks, but an unmistakable indication of criminal prosecution soon revealed to them that the responsibilities of assumed knowledge cannot be avoided by a plea of ignorance. In some instances doctors have prematurely reported recovery. The law of duration in contagious diseases is too well known to allow such heedlessness to escape notice and rebuke. It is sometimes disagreeable to supplement the mental and moral defects of a portion of the profession by the terror of criminal law, but faithful sanitary administration requires it.

2. *At first the people objected to having their houses placarded, as a violation of personal liberty. A little argument convinced reasonable citizens that no man has the natural or acquired right to expose his neighbours to deadly contagious disease by concealing it in his own house. Personal liberty to give smallpox to somebody else had better be abridged as soon as possible. Personal liberty to send scarlet fever into a school with your child is rather diabolical than beneficent. Personal liberty to infect a church with a diphtheria corpse is tempting Providence to start an epidemic. A law-abiding community submitted, and to-day the system of placarding, if it were left to an election, would receive a majority of votes in its favour. Experience proves its value in many ways to the citizen. He knows and feels that, by reason of it, his family is more secure against diseases that cost money, anxiety and sorrow.*

The defects of the system are already apparent to educated sanitarians:—

1. So far as smallpox is concerned, proper vaccination and re-vaccination at suitable ages should be universal and compulsory. I am sorry to say that, in this respect, the sanitary code of Detroit is defective. Without vaccination, suppression of the disease

* It must be remembered that in Michigan the system of free trade in medicine exists, and that there is not the same security for professional behaviour there as with us.

allows the greater accumulation of material for the conflagration of an epidemic, that sooner or later may get under way and defy all control. Every escape from scarlet fever is a positive gain, for susceptibility to the disease decreases with age. Diphtheria should be suppressed all the time, for one attack does not secure immunity in the future.

2. The efficiency of the system depends to a great extent on the willing or enforced co-operation of the medical profession. Just so far as the profession falls short of an ideal standard must the system fail to reach its ideal value, however well it may be administered.

The system in Detroit is supplemented, as it should be, by a pest-house, to which the sick with contagious diseases, who have no homes, can be taken. With an efficient system of placarding and isolation, it is more economic, more humane, if not safer, to leave patients who have homes under the care of their families and friends. However excellent a hospital and its service may be, households are unwilling to give up any of their sick members to be nursed by unknown hands in a strange place. To force away children from parents, from brothers and sisters, and parents from children and from one another, for the purpose of isolating infectious disease, exposes the public by transportation of the afflicted, diminishes the chances of recovery, outrages the unreasoning affections, and invades the sanctity of home. Sanitation must reckon with the unalterable instincts of humanity and restrain itself within the boundaries of reasonable endeavour.

Therefore, in my judgment, the isolation of contagious and infectious diseases in the family, which is the unit of our political society and Christian civilization, is wisest and best. After long administrative training we shall get the willing co-operation of households and their chosen physicians. *The day will come when exposure of others to our diseases will be recognized as a crime*, the punishment of which will be demanded by the public conscience.

In the meantime we must combat superstition, diffuse rational knowledge, and protect the people against pestilence by the simplest and most effective means at our command, winning confidence by patient, kindly instruction, only using repression and the lash of the law when we must.

For the prevention of infectious diseases we are sadly in need of intelligent and trained private endeavour, as a supplement to public sanitation. Would that the clergy, taking for texts the hygienic precepts of Moses, which have not been surpassed by the so-called revelations of modern science, might preach the gospel of cleanliness and thus open up to their people new avenues of godliness! Would that we had in every city a society of devoted men and women, like the order of the Red Cross, whose especial duty it should be to go into the by-ways, not far from their own doors, and save from the perils of contagion and filth a greater number who perish, year by year, in times of peace than ever die on the fields of battle in times of war!

ARTICLE V.

CIRCULAR TO THE CLERKS OF MUNICIPALITIES.

PROVINCIAL BOARD OF HEALTH, ONTARIO,

PARLIAMENT BUILDINGS,

TORONTO, May 1882.

To the Clerk of the Municipality of

DEAR SIR,—The Provincial Board of Health of Ontario, established under "The Public Health Act, 1882," in the discharge of their duties as prescribed in section 3—

"3. The Provincial Board of Health shall take cognizance of the interests of health and life among the people of the Province. They shall especially study the vital statistics of the Province, and shall endeavour to make an intelligent and profitable use of the collected records of deaths and sickness among the people; they shall make sanitary investigations and inquiries respecting causes of disease, and especially of

epidemics; the causes of mortality and the effects of localities, employment, conditions, habits, and other circumstances upon the health of the people; they shall make such suggestions as to the prevention and introduction of contagious and infectious diseases as they shall deem most effective and proper, and as will prevent and limit as far as possible the rise and spread of disease; and they shall, when required or when they deem it best, advise officers of the Government and Local Boards of Health in regard to the public health, and as to the means to be adopted to secure the same, and as to location, drainage, water supply, disposal of excreta, heating and ventilation of any public institution or building"—

desire to secure the assistance and hearty coöperation of Municipal Councils, and therefore request your Municipal Council to inform our Secretary at your earliest convenience if you have exercised the powers already vested in you, and set forth in the Municipal Institutions Act, Chapter 174, Revised Statutes, Ontario, section 466 and sub-sections thereof, giving you power to enact By-laws for the preservation of the public health, and the prevention of the spread of contagious and infectious diseases.

Especially we desire to know if By-laws regarding the construction and location of wells, privies, water-supply, drainage, the cleansing of cesspools, and the removal of other known causes of typhoid fever are enforced; also if means are adopted and enforced to isolate cases of smallpox, diphtheria, scarlet fever, whooping cough, puerperal fever, erysipelas, measles, cholera, etc., so as to prevent the spread of these contagious diseases.

We desire also to know if your Local Board, under "The Public Health Act, Chapter 190," are actively engaged in the discharge of their duties as special Health officers, or if they systematically inspect, or cause to be inspected, all localities dangerous to public health, and if a record is kept of the exact location of cesspools properly so-called.

In order that the residents of the Province of Ontario may realize the great benefits which the Public Health Acts can afford if enforced, it is necessary that the Provincial Board of Health shall be constantly informed regarding the causes and prevalence of disease, and the means adopted for the removal of these causes, and for the prevention of the spread of contagious and infectious diseases in each locality in this Province.

We therefore feel it our duty to ask your Council if they are willing to send our Board weekly or monthly reports on these important points, for which reports we are prepared to send printed forms free of charge.

To such as choose to place themselves in communication with us we will send such sanitary pamphlets and other information as we may suppose may be of importance and interest to you.

I have the honour to be,

Yours truly,

PETER H. BRYCE, *Secretary*.

ARTICLE VI.

CIRCULAR TO PHYSICIANS.

PROVINCIAL BOARD OF HEALTH OFFICE,
PARLIAMENT BUILDINGS,

TORONTO, May 1882.

DEAR DOCTOR,—The Board has directed me to send you a copy of a circular about to be addressed to the Clerks of Municipalities, and to request you to use your influence to obtain a prompt and careful consideration of its contents, and such action upon it as you think may be secured.

The Board counts largely upon the coöperation of medical men in advocating, and interesting the people in such sanitary reforms and systematic action as will tend to lessen the death and sickness rates, and as a consequence, the misery and poverty in the Province.

Trusting that you will oblige the Board by a hearty response,

I have the honour to be,

Yours truly,

PETER H. BRYCE, *Secretary*.

APPENDIX C.

ARTICLE I.

N.B.—The receiver of this Pamphlet is requested to preserve it for reference when required by himself or others.

HOW TO CHECK THE SPREAD OF CONTAGIOUS OR INFECTIOUS DISEASES: SCARLET FEVER, DIPHTHERIA, SMALLPOX, Etc.

[No. 4.] Document issued by the Provincial Board of Health of Ontario.

These diseases are spread by means of infectious particles going from person to person, and can be stopped if care and systematic means are taken to destroy these disease germs, and to prevent their being carried from one person to another.

Those parts of the body which are the breeding places of the contagious particles give off the poison in the greatest amount—for example:—

- In Scarlet Fever, the mouth, throat, nasal passages and skin.
- “ Diphtheria, the mouth throat, and nasal passages.
- “ Smallpox, the pustules, chiefly of the skin.
- “ Measles, the skin and air passages.
- “ Whooping Cough, the air passages.
- “ Typhoid Fever and Cholera, the discharges from the bowels.

The portions of the body thrown off, and containing the contagion may pass into the air, or find their way into water or food, and in this way be introduced by breathing, drinking or eating, or through broken surfaces of the body.

It will be seen that the first five diseases in the above enumeration are very readily communicable through the atmosphere. The contagion of the first three remains virulent for a great length of time and at great distances; and as these diseases are very serious in their effects, our consideration will at present be chiefly directed to them in the following rules for checking their spread:—

WHAT THE GENERAL PUBLIC MAY REASONABLY EXPECT FROM PERSONS AFFLICTED WITH CONTAGIOUS DISEASES, FROM THEIR FRIENDS, AND FROM THE MUNICIPAL AUTHORITIES.

1. When anybody, especially a child or young person, has sore throat, bad breath or fever, he should be kept separated from all other persons except necessary attendants, until it be ascertained whether he has scarlet fever, diphtheria or some other communicable disease.

2. Every case of diphtheria, scarlet fever or smallpox should be at once reported to the Health Officer appointed by the Local Board of Health. (See Secs. 18, 19 and 20, “Public Health Act of 1882.”)

3. On receipt of such notices, the Local Health officers should immediately verify the reports of cases. If the medical attendant reports the case this will be sufficient verification.

The Board should secure the isolation of those sick with or exposed to these diseases;

Give notice of infected places;

Regulate funerals of persons dead from infectious diseases;

Disinfect rooms, clothing, and premises;

Give certificates of recovery and of freedom from liability to communicate the disease.

4. Every person known to be sick with scarlet fever, diphtheria or smallpox should be promptly and effectually isolated from the public; no more persons than are necessary should have charge of the patient, and these should be restricted in, their intercourse with other persons.

5. Notices should be placed on the house in which a case of scarlet fever, diphtheria or smallpox exists, and no unnecessary persons allowed to enter.

(In regard to above, see "Public Health Act, 1882," and Caps. 190 and 174, R. S. O.

MANAGEMENT OF THE SICK ROOM AND DUTIES OF ATTENDANTS.

6. The bed-room of a person sick with scarlet fever, diphtheria, smallpox or any other infectious disease should be cleared of all needless clothing, carpets, drapery, or any material liable to harbour the poison of the disease. The room should be large, having an absolute air-space of at least 1,000 cubic feet for each individual, and should have a liberal supply of fresh air—at least 3,000 cubic feet per head per hour. In summer the supply should be unlimited; windows thrown open, and draughts on the patient prevented by a fine gauze or wire netting, slanting from the top of the sash to within two inches of the ceiling.

7. Discharges from the throat, nose and mouth should be received, or immediately placed, in vessels containing some of the disinfectants named for that purpose in sec. 8; if on rags or handkerchiefs, these should be immediately burned.

Likewise, the discharges from the kidneys and bowels should be passed into vessels containing a pint of disinfectant, and immediately buried at least a hundred feet from any well or other drinking-water supply. If these precautions are impracticable, let the discharges be passed on old cloths, which should immediately be burned.

8. For convenience a few disinfectants are here grouped together:—

- (1) Solution of chlorinated soda (or lime).
- (2) " chloride of zinc: water, 1 gal.; sulphate of zinc, 4 oz.; common salt, 2 oz.
- (3) " chloride of lead: dissolve two drachms, of nitrate of lead in a quart of water,—then, in a larger vessel containing a gallon of water, dissolve two tablespoonfuls of common salt (chloride of sodium); mix the two solutions together and store for daily use.

The above will answer for all purposes of disinfection; discharges, linen, cups, etc.

- (4) Carbolic acid solution—say 1 part in 20 to 40 of water, for discharges and clothes, scrubbing floors, etc., and washing hands.
- (5) Copperas solution— $1\frac{1}{2}$ lbs. commercial sulphate of iron to 1 gal. water.
- (6) Carbolate of lime.

The two last are good for discharges; the copperas very good for privies; the carbolate of lime for sprinkling dry in rooms, sheds, etc.

The carbolic acid solution may be made to permeate the air by spray from an atomizer, and to destroy germs in breathable air by actual contact.

9. *Purification of Clothes and Bedding.*—The best plan, where practicable, is by the agency of heat. Dr. Henry, of Manchester, disinfected scarlet fever clothing by exposure to 212° F. for one hour. A brick oven or portable furnace will answer the purpose, the clothes to be disinfected being hung on wires. Boiling clothes is not so good as baking, but still is useful. To every ten gallons of boiling water add half or three-quarters of a gallon of commercial solution of chloride of lime; or the clothes may be laid for twenty-four hours in a solution of sulphate of zinc in the proportion of 1 to 120, or of chloride of zinc in the proportion of 1 to 240, or in the chloride of lead solution (Sec. 8), and then should be washed with soap and water if they cannot be baked.

10. Nurses and attendants should be required to keep themselves and their patients as clean as possible, disinfecting their hands frequently by chlorinated soda or other disinfectant.

Attendants should also wear cotton or linen (not woollen) clothes or overalls, to which particles will not so readily adhere, and which may be more easily disinfected.

11. Every person recovering from diphtheria should be considered dangerous, and should not be permitted to associate with others, or attend any public assembly until the throat and sores on the lips and nose are healed for some days; nor before, in the judgment of the physician, he can do so without endangering others, nor until his clothing has been thoroughly disinfected. These restrictions, of course, extend to churches, schools, etc. Every apartment of the house must also be thoroughly disinfected before the patient is permitted to go at large.

After recovery from scarlet fever and smallpox, a still longer time must elapse to allow all particles of disease-bearing skin to be thrown off.

12. The body of a person who has died of diphtheria, scarlet fever or smallpox, should be washed with a strong chloride of lead or zinc solution, double the strength of those in Sec. 8, wrapped in a sheet wet with the same, and at once buried. In no case should the body be exposed to view; no public funeral held, and as few persons as possible should attend.

DISINFECTION OF DWELLINGS AND PREMISES AFTER RECOVERY OR DEATH.

13. In addition to thorough cleansing of all wood work with soft soap, and with water to which carbolic acid has been added (one pint of the common liquid to four gallons of water), and to removing and washing all fabrics which can be removed in the manner described in Sec. 9, and brushing the walls, the rooms should be fumigated for a period varying from three to twenty-four hours with sulphurous acid. A metallic dish should be suspended over a tub of water, or should have ashes in it. All doors, windows, and the chimney being tightly closed, sulphur, mixed with a little saltpetre, is to be then placed into the dish and lighted. The proportions should be two pounds of sulphur for every 1,000 cubic feet of space. In a very long room it is best to have the sulphur in two or more places. After the fumigation is completed, the doors and windows should be opened, and kept open for several hours. In disinfecting in this manner with sulphurous acid, the person setting fire to the saltpetre and sulphur must make a precipitate escape from the room the instant the sulphur is burning. Carpets fumigated on the floor by this method should afterwards be removed to the open air and thoroughly beaten. Pillows and feather beds, mattresses, and upholstered furniture, after being disinfected on the outside, should be cut open and their contents exposed to the fumes of burning sulphur. In no case should the disinfection of clothing and bedding be omitted. Where articles of clothing, towels or anything used by sick persons are considered too valueless to be kept, they must not be burned in the house or open air before they have been completely disinfected. A bad epidemic at Philadelphia resulted from neglect of this precaution.

PRECAUTIONS FOR WELL PEOPLE TO AVOID SCARLET FEVER, DIPHTHERIA AND SMALLPOX.

14. Avoid exposure to special contagion. There is more danger for children than for adults; do not, therefore, let a child go near a case. Do not permit any person or thing, dog, cat or other animal, plaything, letters, etc., to come or be brought direct from a case of these diseases to a child, unless previously disinfected under competent supervision. If you do visit a case, bathe yourself, especially your hands, face and hair, in a disinfectant solution, and change and disinfect your clothing before you go where there is a child. See that your residence, premises, etc., are kept clean and dry; that the sewer connections are well trapped and drains well ventilated. Never allow the passages from any person sick with the disease to be placed, without previous disinfection, in water closets or privies, but have them attended to as in Secs. 7 and 8. Give special attention to the purity of your milk supply. Do not allow a child to ride in any vehicle where there is suspicion of infected persons having travelled. Avoid exposure to high winds and cold, dry air. Do not wear or handle clothing worn by a person during sickness or convalescence from these diseases. Beware of any person who has a sore throat or running at the nose. Do not kiss or take the breath of such a person. Do not drink from the same cup or put in your mouth anything used by a

person who has any of the above diseases. This should be especially attended to in the case of children.

15. In case of all these diseases, remember that the contagion may be stored up from one season to another if not destroyed. Do not let it be so stored; and see that your children do not visit a house where one of the above diseases has been, even though some months have since elapsed, unless you know that the house, clothes, etc., have been thoroughly disinfected.

16. In the case of smallpox, too much care cannot be taken to see that every person who has not been vaccinated within seven years be vaccinated or re-vaccinated.

17. If vaccination has "taken well" a few years before, this is, if anything, an extra reason for re-vaccination. Persons who have had smallpox may take it again.

18. With regard to all these diseases, remember that a mild form in one person may originate a severe form in another.

19. In connection with this subject, it should be remembered that too much attention cannot be paid to surroundings in general, such as drainage, ventilation, food, warmth, etc. Temperature and rain-fall have much to do with the spread of some of these diseases. Diphtheria, for example, is generally least prevalent in August, increases until January, and declines again with the same regularity until August. It is also most fatal in the lowest and worst drained parts of cities. Examine the relative positions of wells and privies. Where city water is used, investigate the source of water supply, and the place of debouchure of sewers. (An outbreak of diphtheria in Naples, 1872, was clearly traced to contaminated water.) In country districts, isolated outbreaks, traceable to cesspool effluvia, are not at all uncommon. Frequently the water-closet drain will be found discharging into a cess-pool cleaned out only at rare intervals, the gases generated in the cesspool having no outlet except through the water-closet and into the house. Proper attention to the trapping of waste pipes leading to sewers is too frequently taken for granted, hence examine carefully into the arrangement and ventilation of drains. Ascertain whether, in consequence of attention not having been duly paid to the trapping of overflow, lavatory, and every other waste pipe, gases are not being conveyed in sundry ingenious ways into the various apartments from which they were presumed to be excluded; that, in other words, the house drains and sewers have not been ventilated into the bed rooms.

ARTICLE II.

CIRCULAR SENT TO CLERGYMEN, HIGH SCHOOL TEACHERS AND
PUBLIC SCHOOL INSPECTORS WITH COPIES OF PAMPHLET
FOUND IN ARTICLE I.

PROVINCIAL BOARD OF HEALTH OFFICE,
PARLIAMENT BUILDINGS,
TORONTO, July 25th, 1882.

DEAR SIR,—We have forwarded to you a copy of the pamphlet issued by this Board, on the Prevention of Contagious Diseases; and we trust that you will find it to supply an amount of information, useful in proportion as it becomes disseminated.

To this end the Board hopes that you will use that influence, which your position gives you, in such a manner as your wisdom may suggest as wise.

This Board feels that it is a duty which is incumbent upon every person of influence, to use special means for impressing upon the people the value and necessity of Sanitary measures for lessening mortality by preserving and improving the public health.

We would most respectfully request that you will at your convenience inform this Board of the sanitary condition of your neighbourhood, and of the means you have used to disseminate sanitary knowledge.

I have the honour to be, Sir,

Your obedient servant,

PETER H. BRYCE, *Secretary*.

ARTICLE III.

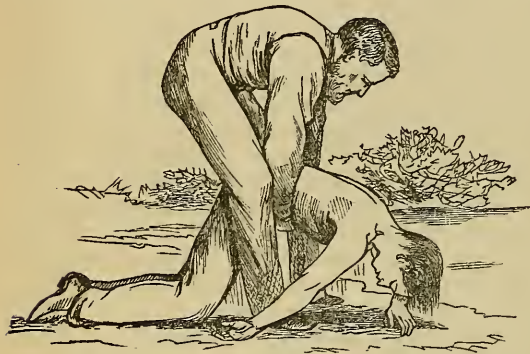
[No. 7.] Issued by the Provincial Board of Health of Ontario.

TREATMENT OF THE DROWNED.

Read this paper now, so as to be ready to act in an emergency. Keep it for reference, and post it in a conspicuous place.

Rule 1. Proceed at once to employ means to restore breathing. Do not delay this in order to procure shelter, warmth, stimulants, etc.

Rule 2. *Remove all obstructions to breathing.*—Instantly loosen or cut apart all neck and waist bands; turn the patient on his face, with the head lower than the feet; stand astride the hips, with your face towards his head, and, locking your fingers together under his belly, raise the body as high as you can without lifting the forehead off the



ground, and give the body a quick jerk to remove mucus and water from the mouth and windpipe. Hold the body suspended long enough to slowly count one, two, three, four, five, repeating the jerk more gently two or three times.

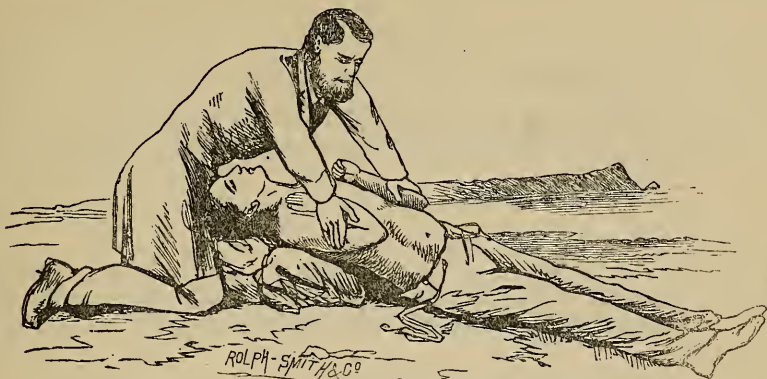
Rule 3. Next place the patient on his back on a flat surface, inclined a little from the feet upwards, raise and support the head and shoulders on a firm cushion, or folded article of dress, placed under the shoulder blades. Cleanse the mouth and nostrils, open the mouth, draw forward the patient's

tongue, securing it there either by holding it with the fingers, or by a piece of string or an elastic band placed over it and under the chin.

Rule 4. Grasp the patient's arms just above the elbows, and draw them gently and steadily upwards until they meet above the head. (This is for the purpose of drawing air into the lungs.)



Keep the arms in this position for two seconds, then turn them down and press them gently and firmly for two seconds against the sides of the chest, pressing at the same time on the breast and abdomen. (This is with the object of pressing air out of the lungs.) Pressure on the breast-bone and abdomen by an assistant will aid this action.



Repeat these measures alternately and deliberately until a spontaneous effort to breathe is perceived, immediately upon which cease to imitate the movements of breathing, and proceed to induce circulation and warmth.

Rule 5. *To excite Respiration.*—During the employment of the above methods irritate the nostrils with snuff or smelling-salts, or tickle the throat with a feather. Rub the chest and face briskly, and dash cold and hot water alternately upon the patient.

Do not be too soon discouraged. Remember that at any time within two hours your efforts may be successful.

Rule 6. *To induce Circulation and Warmth.*—After breathing is commenced wrap the patient in warm blankets, and apply bottles of hot water, hot bricks, or anything to restore heat.

Warm the head nearly as fast as the body, lest convulsions should be induced. Rubbing the body with warm cloths, or with the hands, and slapping the fleshy parts may assist to restore warmth and breathing.

If the patient can swallow *with safety* give him hot coffee, tea, milk or spirits.

Allow the patient to have abundance of fresh air.

HINTS TO WHARF OWNERS AND TO OTHER PERSONS RESIDING NEAR THE WATER.

Keep a coil of rope and pieces of boards in some convenient place, ready for immediate use.

TO PERSONS WHO CANNOT SWIM.

If you get into water beyond your depth do not plunge, struggle, nor throw your hands and arms out of the water. "Tread water" in the erect position, by moving the feet up and down, at the same time slowly paddling with the hands, keeping them under water. If any one approaches to rescue you, preserve your presence of mind and do not grasp him: do what he tells you. If any small object of support be thrown to you, place it under your chest or arm-pits, and do not struggle to raise yourself out of the water; your head will not go under if you follow these directions; and you may keep your mouth and nose above water long enough for assistance to arrive. By considering these directions carefully now, you will be less apt to lose your presence of mind should occasion arise for acting on them.

Parents should have their children taught to swim. Many deaths might be thereby averted.

N. B.—In suffocation by smoke or poisonous gas, as also in cases of hanging or choking, proceed in the same way as in drowning, seeing that no obstruction exists in the mouth and throat, but omitting the effort to expel water, etc., from the lungs.

ARTICLE IV.

MEMORANDUM FORWARDED WITH OTHER DOCUMENTS OF THE BOARD
TO CLERKS, PHYSICIANS, &c., CONCERNING THE POWERS AND DUTIES
OF MUNICIPAL AUTHORITIES RESPECTING THE PUBLIC HEALTH.

The Act respecting the Public Health, being Cap. 190 of the Revised Statutes of Ontario, provides :—

That the members of the Municipal Council of every township, city, town and incorporated village shall be Health officers, and gives such Council power to delegate its powers to a Committee of their own number, or to such persons as the Council thinks best.

1. Such Health officers are given power in the daytime to enter any premises within their municipality, and, if found filthy or unclean, or in way dangerous to the public health, they may order the proprietor or occupant to cleanse them, and in default of his doing so, may cause them to be cleansed.

2. In case of a malignant and fatal disease being discovered in any house in the municipality of a city, town, village or township, or within a mile thereof, the Health Officers may compel the removal of the occupants from the premises until they can be thoroughly disinfected and cleansed.

Such a Board likewise has power to make regulations for purposes of isolation within the municipality, under Section 17 and other Sections of the Public Health Act of 1882, a copy of which Act is sent herewith.

The Health officers should visit and inspect premises in respect of which a complaint is made, or where they deem it necessary to make an investigation, and may order the removal of any causes of disease which they find there.

A Local Board of Health has no power to enact by-laws or rules for the purpose of carrying out sanitary reforms, but the Municipal Institutions Act (R. S. O. Cap. 174) provides that the Municipal Council of every city, town or incorporated village may pass by-laws—

1. For regulating public wells and conveniences for water ; and for preventing the wasting and fouling of public water.

2. For preventing the use of deleterious materials in bread.

3. For seizing and destroying tainted and unwholesome meat, poultry, fish and other articles of food.

4. For preventing and abating public nuisances.

5. For preventing or regulating the construction of privy vaults and slaughter houses.

6. For providing for the health of the municipality, and against the spreading of contagious and infectious diseases.

7. For the interment of the dead.

8. For cleaning away filth from the streets.

9. For regulating the construction of privy vaults, water-closets, cellars, sinks, and for the filling up, draining and cleansing of any ground cellars, private drains, sinks, cesspools or privies.

All these powers rest in Municipal Councils irrespective of any duties vested in the members of Local Boards of Health under the Health Act.

The "Act respecting Vaccination and Inoculation" gives further powers for preventing inoculation, and for providing, in cities, for free and compulsory vaccination.

In order efficiently to enforce sanitary laws in accordance with the foregoing legislative enactments, it would materially assist matters if a Health Officer were appointed by the Council in each municipality, the special duty of whom it would be to see to the enforcement and carrying out of the provisions of any by-law or the requirements of the Local Board of Health.

This Health Officer should be made the official channel of communication between the Provincial Board and the Local Boards of Health, and should be a member of the Local Board. He should report at regular intervals regarding contagious and infectious diseases, and other matters of interest relating to the public health of the municipality.

NOTE.—It has been held an indictable offence to bring a glandered horse into the market, and to expose a person afflicted with smallpox in an open street.

[No. 9.]

ARTICLE V.

COPY OF CIRCULAR CONCERNING THE CLASSIFICATION OF DISEASES WITH APPENDED CLASSIFICATION.

OFFICE PROVINCIAL BOARD OF HEALTH,
PARLIAMENT BUILDINGS.

To Correspondents of the Provincial Board of Health :—

It is requested that in making returns you will follow, as far as possible, the classification adopted by this Board, thus promoting uniformity and accuracy in the Weekly Reports.

To Physicians :—

In making returns of deaths to the Clerks of Municipalities, it is hoped that care will be taken to have them adapt the same classification.

To Clerks of Municipalities :—

It is expected that Clerks will require of persons, not physicians, reporting cases of death, that it be done by a physician's certificate stating the cause of death, or, in case this be not presented, that care be taken that the disease be given according to the terms used in the classification adopted by this Board.

Your obedient servant,

DR. P. H. BRYCE, M.A.,

Secretary.

The following is the classification of diseases adopted by the Provincial Board of Health :—

CLASS I.—ZYMOTIC DISEASES (*Zymotici*).

ORDER 1.—MIASMATIC DISEASES (*Miasmatici*).

Anthrax (Carbuncle).
Cholera asiaticum (Asiatic Cholera).
Cholera Infantum.
Cholera Morbus.
Cynanche trachealis (Membranous Croup).
Diarrhœa acuta (Acute Diarrhœa).
Diarrhœa chronica (Chronic Diarrhœa).
Dysentery acuta (Acute Dysentery).
Diphtheria (Diphtheria).
Enterocolitis.
Erysipelas (Erysipelas).
Erythema (Erythema).
Febris biliosa (Bilious Fever).
Febris cerebro-spinalis (Cerebro Spinal Fever).
Febris congestiva (Congestive Fever).
Febris flava (Yellow Fever).
Febris intermittens (Intermittent Fever).
Febris remittens (Remittent Fever).
Febris typhoides (Typhoid Fever).
Febris typhus (Typhus Fever).
Furunculus (Boil).
Influenza (Influenza).

Miliaria (Miliaria).
Morbilli (Measles).
Parotitis (Mumps).
Pertussis (Whooping Cough).
Pyæmia (Pyæmia).
Scarlatina (Scarlet Fever).
Tonsillitis (Quinsy).
Varicella (Chicken-pox).
Variola (Small-pox).
Varioloides (Varoloid).
Other Miasmatic Diseases.

ORDER 2.—ENTHETIC OR INOCULATED DISEASES (*Enthetici*).

Equinia (Glanders).
Gonorrhœa (Gonorrhœa).
Hydrophobia (Hydrophobia).
Morbus ossium syphiliticus.
Necrosis (Dissection Wound).
Ophthalmia Gonorrhœica.
Phagadæna gangrænosa (Hospital Gangrene).
Pustula maligna (Malignant Pustule).
Syphilis primaria (Primary Syphilis).
Syphilis secundaria (Secondary Syphilis).
Syphilis tertiaria (Tertiary Syphilis).

ORDER 3.—DIETIC DISEASES (*Dietici*).

Alcoholismus (Alcoholism).
 Bronchocele (Bronchocele).
 Cretinismus (Cretinism).
 Delirium alcoholicum (Delirium Tremens).
 Ebriositas (Drunkenness).
 Ergotismus (Ergotism).
 Febris a fame (Famine Fever).
 Purpura (Purpura).
 Rachitis (Rickets).
 Scorbutis (Scurvy).

ORDER 4.—PARASITIC DISEASES (*Paracitici*).

Apthæ (Thrush).
 Ascarides (Ascarides).
 Hydatides (Hydatids).
 Forrigo (Scaldhead).
 Scabies (Itch).
 Tænia solium (Tape-worm).
 Trichinosis (Trichinosis).
 Vermes (Worms).
 Other Parasitic Diseases.

CLASS II.—CONSTITUTIONAL DISEASES
(*Cachectici*).ORDER 1.—DIATHETIC DISEASES (*Diathetici*).

Anæmia (Anæmia).
 Anasarca (General Dropsy).
 Arthritis (Articular Rheumatism).
 Asthma (Spasmodic Asthma).
 Carcinoma (Cancer).
 Gangræna senilis (Dry Gangrene).
 Hydrops (Dropsy).
 Leucocythæmia.
 Mortificacio (Mortification).
 Noma (Cancrum Oris).
 Podagra (Gout).
 Podagra rheumatica (Rheumatic Gout).
 Rheumatismus (Rheumatism).
 Ulcus ex cubando (Bedsores).

ORDER 2.—TUBERCULAR DISEASES (*Phthisici*).

Abscessus psoasus (Psoas Abscess).
 Hæmoptysis (Spitting Blood).
 Hydrocephalus.
 Meningitis tuberculosis (Tubercular Meningitis).
 Morbus coxarius (Hip Disease).
 Peritonitis tuberculosis (Tubercular Peritonitis).
 Phthisis pulmonalis (Consumption).
 Scrofula (Scrofula).
 Tabes Mesenterica (Marasmus).
 Other Tubercular Diseases.

CLASS III.—LOCAL DISEASES (*Monorganici*).ORDER I.—DISEASES OF THE NERVOUS SYSTEM
(*Cephalici*).

Apoplexia (Apoplexy).
 Atrophia musculorum ingravicans (Progressive Locomotor Ataxia).
 Chorea (St. Vitus' Dance).
 Convulsio (Convulsions).
 Encephalitis (Inflammation of the Brain).
 Epilepsia (Epilepsy).
 Hemiplegia (Paralysis of one side of the body).
 Hydrocephalus acutus (Acute Hydrocephalus).
 Hysteria (Hysteria).
 Insania (Insanity).

Insolatio (Sunstroke).
 Laryngismus stridulus (False Croup).
 Meningitis.
 Myelitis (Inflammation of the Spinal Chord).
 Necrencephalus (Softening of Brain).
 Paralysis (Palsy).
 Paralysis agitans (Shaking Palsy).
 Paraplegia (Palsy of Lower Extremities).
 Tetanus (Lockjaw).
 Trismus nascentium.

Other Diseases of the Nervous System.

ORDER 2.—DISEASES OF THE CIRCULATORY SYSTEM
(*Cardiaci*).

Aneurisma (Aneurism).
 Angina pectoris (Breast Pang).
 Arteritis (Inflammation of Arteries).
 Atheroma arteriarum (Calcification of Artery).
 Atrophia cordis (Atrophy of Heart).
 Carditis (Inflammation of Heart).
 Degeneratio cordis (Fatty Degeneration of Heart).
 Embolismus (Embolism).
 Endocarditis (Inflammation of Membrane lining Heart).
 Epistaxis (Nosebleed).
 Hydrops pericardii (Dropsy of Heart).
 Hypertrophia cordis (Enlargement of Heart).
 Morbus valvularum cordis (Valvular Disease of Heart).
 Pericarditis (Inflammation of Membrane covering Heart).
 Phlebitis (Inflammation of Veins).
 Syncope (Fainting).
 Varices (Varicose Veins).

ORDER 3.—DISEASE OF THE RESPIRATORY SYSTEM
(*Pneumonic*).

Apoplexia pulmonalis (Congestion of Lungs).
 Bronchitis (Bronchitis).
 Diaphragmitis (Inflammation of Diaphragm).
 Emphysema.
 Empyema.
 Gangrænum pulmonum (Gangrene of Lungs).
 Hydrothorax (Dropsy of Chest).
 Laryngitis (Inflammation of Larynx).
 Œdema glottidis.
 Pleuritis (Pleurisy).
 Pleuro-Pneumonia (Pleurisy and Inflammation of Lungs).
 Pneumonia (Inflammation of Lungs).
 Pneumothorax.
 Other Diseases of the Respiratory System.

ORDER 4.—DISEASES OF THE DIGESTIVE SYSTEM
(*Enterici*).

Ascites (Abdominal Dropsy).
 Cholelithus (Gallstones).
 Cirrhosis.
 Colica (Colic).
 Duodenitis (Inflammation of Duodenum).
 Dyspepsia (Indigestion).
 Enteritis (Inflammation of Bowels).
 Fistula in ano (Fistula).
 Gastritis (Inflammation of Stomach).
 Glossitis (Inflammation of Tongue).
 Hæmatemesis (Blood-vomit).
 Hæmorrhoids (Piles).
 Hepatitis (Inflammation of Liver).
 Hernia (Rupture).
 Icterus (Jaundice).
 Ileus (Ileus).
 Intus-susceptio (Invagination of Gut).
 Melæna.
 Obstipatio (Constipation).
 Œsophagitis (Inflammation of Gullet).

Perforatio intestini (Perforation of Intestine).
 Peritonitis (Inflammation of Abdomen).
 Pharyngitis (Inflammation of Pharynx).
 Splenitis (Inflammation of Spleen).
 Stomatitis (Inflammation of Mouth).
 Stricture intestini (Stricture of Intestine).
 Tophilitis.
 Ulceratio intestini (Ulceration of Intestine).
 Ulcus stomachi (Ulcer of Stomach).
 Other Diseases of the Digestive System.

ORDER 5.—DISEASES OF THE URINARY SYSTEM (*Nephritici*).

Calculus (Stone).
 Cystitis (Inflammation of Bladder).
 Diabetes.
 Hæmaturia (Bloody Urine).
 Ischuria (Retention of Urine).
 Lithiasis (Gravel).
 Morbus prostaticus (Diseased Prostrate).
 Nephria (Bright's Disease).
 Nephritis (Inflammation of Kidneys).
 Stricture urethræ (Stricture of Urethra).
 Other Diseases of the Urinary System.

ORDER 6.—DISEASES OF THE GENERATIVE SYSTEM (*Genetici*).

Hydrocele (Dropsy of Testicle).
 Hydrops ovarii (Ovarian Dropsy).
 Metritis (Inflammation of Womb).
 Morbus uteri (Uterine Disease).
 Polypus uteri (Uterine Polypus).
 Tumor ovarii (Ovarian Tumor).
 Tumor uteri (Uterine Tumor).
 Varicocele (Varicocele).

ORDER 7.—DISEASES OF THE LOCOMOTIVE SYSTEM (*Myostici*).

Arthritis (Inflammation of Joints).
 Atrophia musculorum (Muscular Atrophy).
 Caries.
 Exostitis (Tumor of Bone).
 Mollities ossium (Softening of the Bones).
 Morbus articularum (Joint Disease).
 Necrosis.
 Osteo-myelitis.
 Ostitis (Inflammation of Bones).
 Periostitis.
 Synovitis.

ORDER 8.—DISEASES OF THE INTEGUMENTARY SYSTEM (*Chrotici*).

Abscessus (Abscess).
 Eczema.
 Ecthyma.
 Pemphigus.
 Phlegmon.
 Rupia.
 Paronychia (Whitlow).

CLASS IV.—DEVELOPMENTAL DISEASES (*Metamorphici*).

ORDER 1.—DEVELOPMENTAL DISEASES OF CHILDREN (*Paidici*).

Amentia ingenua (Idiocy).
 Anus imperforatus (Imperforate Anus).
 Atelectasis pulmonum.
 Cyanosis.

Dentitio (Teething).
 Hæmorrhagia umbilicalis (Umbilical Hæmorrhage).
 Natus præter naturam (Preternatural Birth).
 Palatum fissum (Cleft Palate).
 Partus emortuus (Still-birth).
 Partus intempestivus (Premature Birth).
 Sclerema.
 Spina Bifida.

ORDER 2. DEVELOPMENTAL DISEASES OF WOMEN (*Gyniæci*).

Abortus (Abortion, Miscarriage).
 Chlorosis.
 Climacteria (Turn of Life).
 Eclampsia parturi (Convulsions in Childbirth).
 Febris puerperalis (Puerperal Fever).
 Graviditas extra uterina (Extra Uterine Fætation).
 Hæmorrhagia post partum (Flooding).
 Mania puerperalis (Puerperal Mania).
 Partus (Childbirth).
 Pelvis deformis (Deformed Pelvis).
 Phlegmasia dolens (Milk Leg).
 Chronic Pelvic Cellulitis.

ORDER 3. DEVELOPMENTAL DISEASES OF OLD PEOPLE (*Geratici*).

Gangræna senilis (Senile Gangrene).
 Senectus (Old Age).
 —(Senile Debility).

ORDER 4. DISEASES OF NUTRITION (*Trophici*).

Atrophia (Atrophy).
 Debilitas (Debility).
 Degeneratio (Degeneration).

CLASS V.—VIOLENCE TENDING TO SUD- DEN DEATH (*Thanatici*).

ORDER 1. ACCIDENT AND NEGLIGENCE.

Ambusta (Burns and Scalds).
 Amputatio (Amputation).
 Concussio (Concussion of Spine).
 Contusio (Contusion of—).
 Explosio (Explosion of—).
 Fractura (Fracture) (of spine).
 Gelatio (Freezing).
 Ictus fulminis (Lightning).
 Morsus serpentis (Snake-Bite).
 Suffocatio (Suffocation).
 Submersio (Drowning).
 Venenatio (Poisoning by—).
 Vulnura (Wounds).
 Other Causes of Violent Death.

ORDER 2. DEATHS IN BATTLE (*Polemici*).

ORDER 3. HOMICIDE (*Androphonici*).

Murder and Manslaughter.

ORDER 4. SUICIDE (*Autophonici*).

Submersio (Drowning).
 Suspendium (Hanging).
 Venenatio (Poisoning by).
 Vulnura (Wounds).

ORDER 5. EXECUTION (*Demiōtici*).

Suspendium (Hanging).

APPENDIX D.

ARTICLE. I.

REPORT OF THE SARNIA INVESTIGATION COMMISSION, *RE* AN OUT-BREAK OF ENTERIC (TYPHOID) FEVER.

TORONTO, May 9th, 1882.

To the Chairman and Members of the Provincial Board of Health :

GENTLEMEN,—In compliance with the request of the Provincial Secretary that your Committee should obtain information with regard to the sanitary condition of towns in the West, where, from the level nature of the land, miasmatic and other fevers would be most likely to prevail; and further to report upon drainage, sewerage, and disposal of sewage generally, so that from statistics so obtained, the Board, at its inaugural meeting, might be better able to judge what advisory information, relating to the best means to be employed for the preservation of public health, the Board should order to be printed for general circulation throughout the Province of Ontario; and having been informed that Typhoid Fever was more than usually present in the town of Sarnia and vicinity, your Committee judged it advisable to select Sarnia as the first place of enquiry. For the facilities afforded your Committee for conducting this investigation, by the city authorities, medical men, and inhabitants of Sarnia generally, we have to express our thanks, and further to state that the hearty spirit evinced for rendering every aid was sufficient to convince us that in the promotion of public hygiene, the residents of the town of Sarnia will always be in the van.

A brief investigation sufficed to convince us that at the time of the establishment of the water-works, some oversight had been committed. To these we will briefly refer.

The progressive spirit of the inhabitants of the towns and cities of Canada demands all modern improvements inside their houses. They ask for water supply and waste pipes in all directions; but, if adequate sewerage is not provided simultaneously with the water supply, the surroundings of the houses must become impure.

The increased use of water is justly regarded as one of the most valuable agents in contributing to comfort and luxury; but it must not be forgotten that it brings with it more risks, and demands the most careful attention, since the more water we dilute our sewage with, the further it will penetrate through pores, and diffuse itself through the soil unless let off in proper channels, to places whence it cannot return and poison the inhabitants. Filth must be carried away as fast and as far as possible.

There has obviously been a deficiency of lateral drains, provided for the due carrying off of pollution at the time of establishing the water-works; and, as a consequence, there is reason to believe that soakage from privies and cesspools has found its way into the wells.

This soakage may frequently have contained the germs of Typhoid and other epidemic diseases, present in the excreta of patients. The general consensus of medical opinion at the present day points to specific germs as the sole factors of Typhoid, Diphtheria, Scarlet Fever, etc., etc.; and that malaria, while unquestionably the cause of Remittent and Intermittent Fevers, has little or no influence in the genesis of Enteric (Typhoid) Fever.

While, then, it is of great consequence by drainage of land to remove the exciting causes of the former, it is of still greater importance that the sources of drinking water should be absolutely pure, for water, contaminated with these germs may look as pure as ever, and taste as cool and refreshing, and yet contain the seeds of disease.

Entertaining these views, and they are those of the profession, not only on this continent, but also in Europe, we could not but regard with alarm the close neighbourhood of the *debouchure* of the main sewer in George Street, with the source of water supply for the pumping house, the current of the river at that place being greatly diminished by the projecting Point Edward.

But, further, account must be taken of the fact that the comparatively stagnant Bay water holds a large quantity of decaying vegetable matter and refuse from the shores in solution, and is consequently malarial; that the water-closets of the gaol and county buildings, as also of several private residences, drain into it, and that water from an open ditch, proceeding from a low, alluvial district, also enters.

It cannot, then, fail to be admitted, that with these probable factors of disease enumerated; also with the opening of the George Street sewer, containing a large amount of town sewage, and in addition, that of outlying country, opening in near proximity to the water supply, that the apprehensions of very many of the inhabitants concerning the source of the water supply, were not entertained without reason.

The Council of Sarnia, admitting the probability of the correctness of these views as to the origin of the unusual prevalence of Typhoid, had submitted a plan, designed by an able Detroit sanitary engineer, to the ratepayers for adoption, but as it involved an amount of cost that was considered beyond their ability to meet, the carrying out of this most essential measure for the arrest of disease was for a time abandoned.

A modification of this plan in the way of removing the George Street sewer, and substituting one some blocks farther down the river, but still continuing the present site of water-works, was, we were informed, under consideration by the Council at the time of our visit.

Bearing in mind the character of the Bay water, as before described, your Committee cannot consider such a modicum of improved sanitary precaution as at all equal to the exigencies of the case.

The purest source of supply would be from Lake Huron, two miles distant, but as water obtained from this source might involve an expenditure entirely beyond the financial ability of the residents, we would recommend that the water should be conveyed by conduits from high up the St. Clair side of Point Edward, or, otherwise, the water-works removed there. The permanence of the purity of water from this source of supply would, of course, depend on the point of land remaining as at present, unoccupied for purposes other than as a coal depot for the Grand Trunk, since, immediately the land was taken up for residences, manufactories or slaughter-houses, pollution of the stream would, of course, commence.

To suggest a system of sewerage, disposal of sewage, and pure water supply, based only on a knowledge of localities obtained in two days, and within the compass of a Report of this kind, would be impossible; every city or town must be the subject of study by a competent engineer; and such a one we would recommend the Council to employ, in order to determine the cost of procuring the water supply directly from Lake Huron, as we conceive that the source from the St. Clair side of Point Edward would only be for a few years free from pollution.

There are a few points we consider it to be our duty as members of the Provincial Board of Health to impress upon your honourable body:

1st. That sewage should always leave a city or town within twelve hours at most after its generation, and that it should never be retained long enough to become decomposed.

2nd. That in all instances of an unusual prevalence of Typhoid Fever, there are unmistakable evidences that something is wrong in the sanitary condition of the community reporting it; and that baneful influences are at work, demanding investigation, and, if possible, removal.

3rd. That the universal experience of the profession points to epidemics of Typhoid as being the result of defective drainage, to the presence of sewer gases, to germs of the disease carried by water from privies, cesspools and water-closets into either wells or the mouths of main sewers, entering into rivers or lakes in close proximity with the pipe from the *pumping-house* supplying the town or city with drinking water.

4th. A large proportion of cases can be traced usually to local origin; or, in other instances, to where sporadic cases occur in individuals who, with the germs of the disease in their system, have come to visit friends at a distance, and where, from ignorance of the necessary precautions, the attendants of the sick person have not only failed to disinfect the excreta of such patients, but have also deposited them in privies or water-

closets, instead of burying them in the ground far away from cisterns, wells, or other sources of water, or storage of milk supply.

5th. When any epidemic breaks out in town, city or village, the first remedy in such cases would be the appointment by the Local Board of Health of a Commission on Sewage, as also a Health Officer, who should be a medical man, who, in addition to a jealous watching that due regard is paid to the observance of the general health by-laws, should see that privies, instead of being pits in the ground, should be moveable receptacles, which should be emptied in trenches, their contents being first covered with disinfectants, and subsequently with soil to the depth of several inches. This removal during a season of epidemics should be monthly or oftener.

6th. In the third proposition it was stated that epidemics of Typhoid were to be attributed to defective drainage, to the presence within houses of sewer gases, etc.

This being the case, we consider it therefore advisable to recommend: That when the use of water-closets in the house is resolved upon, the pan-closet be carefully avoided; Latham, in his work on Sanitary Engineering, very correctly speaks of them as cumbersome appliances which cannot be introduced into a house without creating a nuisance; the Hopper closet is but little more expensive, and far safer. Care must be taken that the waste pipe from every sink, bath, or lavatory, the overflow pipe from any cistern, and every pipe for carrying off waste water, be furnished with a syphon trap, which ought to be taken through the external wall of such building, to a trapped exterior sewer—the said exterior sewer having a shaft or pipe not less than two inches and a half in diameter, communicating with the outer air above the eave spouts of the dwelling.

7th. The functions of Local Boards of Health should be the investigation of undue sickness and mortality, and, as far as possible, the providing of remedies for such sickness.

In accordance with the enactments of the present municipal law, it is competent for local Boards of Health to ask from city or town councils an appropriation for sanitary purposes. Such an appropriation, in our judgment, would suffice for a mitigation of existing faulty arrangements, pending the thorough change in the system of sewerage, and the disposal of sewage which, for the health of the inhabitants, it is desirable should, as quickly as possible, be effected.

That the general feeling of the citizens of Sarnia will be in favour of prompt action, we entertain no doubt; the mere fact of their neighbours, on the opposite side of the river, enjoying complete exemption from a preventible disease, cannot fail to forcibly impress upon them the immediate steps requisite for procuring that which is the very best inducement for new comers to settle in their very desirably situated town, viz., the reputation for pure air and pure water—the two most important factors of health.

To Drs. Stockwell, senior and junior, as also to the Health Officer of Port Huron, your Committee desire to offer their most sincere thanks for the courteous reception accorded them, as also for the great facilities afforded them for becoming acquainted with the advanced system of hygienic precautions enforced on the citizens, and with the various details of the yearly bills of mortality. The following are the notes taken at the time of our visit:

NOTES *re* THE OUTBREAK OF ENTERIC (TYPHOID) FEVER IN SARNIA, TAKEN APRIL 15TH, 1882.

1. *Sewerage.*—In the year 1870, and before that time, there were occasional very mild cases of Typhoid Fever. The present drainage system was the result of constant additions to sewerage drains during the past twelve years. There are at present three main sewers emptying at the water's edge—one at the foot of George Street, one at the foot of Cromwell Street, and one at the foot of Wellington Street.

The George Street main sewer is about one mile in length, and is the oldest. It runs parallel with George Street, and between George and the next street. Between Milton Street (which runs at right angles to George) and the river the sewer is covered; above Milton Street it is nearly all open, small portions only, at different points, being closed.

EAST STREET

E

Well populated Part of Town

Sandy Soil

GRAVE
YARD

CONCRETE STREET
TOWNSHIP Docks

Point Edward G.T.R. Coal Docks

POINT STREET

GOAT

WATER WORKS

MAP OF TOWN OF SARINIA,

PLAN OF PORTFIDE SIXTH WARDEN'S
DIVISION OF RIVER & LAKES, N.C.

1. The City of Sarinia is a city of the State of North Carolina, and is situated on the banks of the River & Lakes, N.C.
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POINT EDWARD
G.T.R. Coal Docks

AMERICAN SHORE.

WHARF

CONCRETE STREET
TOWNSHIP Docks

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The backs of the houses on George Street are all at the edge of the open portion of the George Street sewer; so that all the refuse from these houses is allowed to accumulate in the sewer, and may be seen floating along in the sluggish current of the stream, or collected in places along the edge of the water. The fall in George Street sewer is 40 (5 in. in 100 ft.) The covered portion is 36 inches wide, and 30 inches high; the depth of water running through this portion of the sewer is 5 inches, and the current is slow. There are about forty-nine water-closets between George and Wellington Streets, and a great many of these empty directly or indirectly into the George Street sewer.

At the wharf at the foot of George Street may be seen the sewer water mixing with the water of the bay. Near the mouth of the sewer—about thirty feet away—is the water-works engine-house, and the water supply pipe passes out very near to the mouth of the sewer.

Cromwell Street drain is 30 inches wide, and carries a stream of about 5 inches of sewerage.

Wellington Street drain is about 24 inches by 20 inches.

There are several *laterals* emptying into George Street sewer—for instance Vidal Street drain, 12 x 14 inches, into which 9 water-closets empty; Christina Street drain 8 x 8 inches, into which 5 water-closets empty. This latter drain is old and in some places rotten, and has very little fall; quicksand also penetrates into the drain. Into Richard Street drain 2 water-closets empty.

Lochiel Street drain is 12 x 12 inches, and should empty into the river. The fall, however, is directed towards the upper end of the drain.

There are ventilators for the sewers in some places at the corners of streets, but without any charcoal beds.

2. *Water Supply*.—In 1876 the present water-works were established. At that time a warm discussion occurred as to the best point from which to draw the water supply. The advocates of pure water were municipally defeated. The medical profession in Sarnia advocated the obtaining of the water supply from the current of the river where the water was pure.

The owner of the property where the water-works are at present built was at that time a member of the Council, and his views prevailed. The engine was accordingly placed at the foot of George Street where it now stands.

The pipe conducting the water supply passes out parallel with the outlet of the sewer at the foot of George Street and very near to it, passing out into the river a distance of two hundred feet from the mouth of the sewer.

By reference to the diagram a downward bend appears in the pipe. This bend was not in the pipe when originally laid. At first the pipe extended forty-five feet out into the river, at a depth of twenty-two feet from the surface of the water.

When the pipe was in this position—in the year 1879 or 1880—an ice jam occurred which ploughed up the bed of the river under the water supply pipe and broke it off at the commencement of the downward bend. The new pipe was added from this point (a) to point (b), and the pipe extended to its present distance—190 feet into the river.

At the end of the pipe is a strainer, as shown in diagram, pointing upwards from the bed of the river fifteen feet, and reaching within twenty-nine feet of the surface of the water.

Whatever river current there may be is admitted by all to be deep, while the reflex eddy current included by Point Edward is principally superficial.

It is supposed that the weight of the pipe beyond the bend has a tendency to cause a separation of the joints in the portion under the wharf, so that a leakage occurs, allowing the sewerage to enter the supply pipe. This, however, was not investigated.

The river is over one mile wide where the supply pipe is situated, and the main current appears to come from the elevator on the American side across to the *whirlpool* on the Canadian side, below the elevator at the foot of Confederation Street, where a malt-house is built.

The current is somewhat diverted, apparently, by Point Edward, and prevented from coming directly across to the foot of George Street, being thus thrown out beyond the centre of the river. (*Vide plans*.)

There is consequently an eddy caused around the water supply pipe, into which are received the stagnant waters of the bay, enclosed by Point Edward.

This bay contains malarial water, and on the stones of the shores may be seen refuse from sheds and stables. The soil on the shore of the bay is loose and sandy near Point Edward, but near Sarnia it is rich black muck.

3. *Typhoid Fever (Enteric)*.—Since 1870 Typhoid Fever has been increasing. In 1878 there was a larger number than usual of cases of Typhoid Fever, many of these presenting abundant characteristic symptoms, while some were fatal. They occurred in what was then called the South Ward.

In 1879 a terrible epidemic commenced in the latter part of August, and continued until the New Year, 15 per cent. dying.

In 1880–81 there was a severe epidemic of Typhoid Fever, continuing through the winter, when the thermometer sometimes registered 18° below zero.

Since 1879 there have been cases of fever during every month of the year; the greatest number occurring in the fall.

The majority of these cases appeared between Wellington and George Streets; all occurred in Wards 1, 2, and 3; while one case lately was in the 4th Ward, it being that of a mother who lived in the 4th Ward, and went to attend her daughter who was sick in the 2nd Ward. After the recovery of the daughter the mother came home, and was sick in bed of Typhoid Fever.

There are at present over forty cases of Typhoid Fever, while the population is estimated at between 4,000 and 5,000. There are besides these some cases of *incipient* Typhoid and Diarrhœa.

Diarrhœa is a frequent complication of the Typhoid, while there have been several fatal cases of *perforation*. By the kindness of Dr. Fraser we were shown a case of Fever on Christina Street, which exhibited the most characteristic symptoms. *Petechiæ* covered the chest, neck, and abdomen, and *sudamina* were seen in abundance, temperature 103½ in the morning, *subsultus*, *delirium at night*, *dry tongue*, and *tympanites*. These symptoms were present on the thirteenth day. Cases quite as severe as this were common.

On the corner of Vidal and George Streets we saw three cases of Typhoid Fever in a small frame house. One patient was a child about ten years of age covered with *petechiæ*, and also showing large numbers of *sudamina*. This was pointed out as a house in which Typhoid Fever had existed for months, although they did not use water from the water-works.

We examined the premises and found water in the privy-vault within two feet of the ground. The George Street sewer (covered at this point) crossed the next lot, just on the other side of the fence. The well was about fifty feet from the privy, and about the same distance from the sewer. It was stated by the occupants of the house that there was no cellar, but that if a hole were dug six feet into the ground water would rise in the hole about two feet in a few hours. The soil was a loose, sandy loam. The well was sixteen feet deep and bricked up at the sides, while the people drank the water. New-comers appeared very susceptible to the Fever.

One house on Lot B, London Road, was pointed out to us as a house in which there has been Typhoid Fever ever since the water supply pipe was extended to it. Before that time a case of Fever had not been known in it. The occupant of this house, partly at his own expense, had the water pipe extended to his premises for his own convenience. No other house in the vicinity had either water supply or Typhoid.

A house receiving no water supply, occupied by the informant, situated also on this street, and on Lot A, north of London Road, and only a short distance from Lot B, was free from fever, and had always been free from it. The soil is dry, sandy, and easily drained in this locality.

4. *Port Huron*.—We also visited Port Huron, and had an interview with Dr. Stockwell, who takes a great interest in sanitary reforms, and who said that they have water-works costing \$175,000. The source of their water supply is at a part of the river above Point Edward where the current passes the American shore at the rate of six miles an hour, at the point where it comes out of the lake directly, and where the river

is narrow, being about 500 feet wide. The water supply is pure. A portion of the town is drained by natural means. There is a bed of twigs about fourteen feet below the surface of sandy soil with a substratum of clay. There are two brick sewers—one 1,500 feet long, and one 800 feet long, with *laterals*.

In 1854-5 they had an epidemic of Cholera or Diarrhœa, but with this exception have had no epidemics. They have had no epidemic of Typhoid Fever; have had no cases exhibiting petechiæ, sudamina, tympanites, or iliac tenderness. Dr. Stockwell, Jr., had one case of Typhoid Fever with *perforation*, at a point some distance out in the country, two or three years ago. Occasionally, in the fall, they have Typho-malarial Fever, but these do not show symptoms indicative of Typhoid Fever.

At present they have not one case of Typho-malarial Fever, and never had in Dr. Stockwell's recollection any in the spring.

At the request of Dr. Stockwell we visited the water-works, and found everything in fine order, the works yielding \$2,000 or \$3,000 profit above expenses.

5. *Addenda*.—In answer to the opinions urged by some of the inhabitants that it was not correct to assign the city water supply as the sole cause of the Typhoid prevailing in Sarnia, inasmuch as cases had occurred in a Ward, the inhabitants of which depended solely on well-water for drinking and other purposes, we would reply that from information obtained we are in a position to state that the soil in this Ward is clay, excepting one or two limited areas of sandy soil in the northern part of the Ward, consequently soakage from privies, cess-pools or stables would not be likely to occur, especially as we learned that the wells were 10 to 40 feet from the houses; privies were 20 to 100 feet from the houses, and about the same distance from wells; while the stables were 40 to 50 feet from the houses, and there were very few in the Ward.

This Ward is drained by open ditches into a small creek running through it and sloping toward the river. There are no soil pipes in the Ward.

We have the honour to remain,
Yours truly,

CHARLES WM. COVERNTON, M.D.,
H. P. YEOMANS, M.D.

The following is a copy of the endorsation by the Board of the Report of the Commission, a copy of which was forwarded to the Mayor and Town Council of Sarnia:—

Moved by Dr. Rae, and seconded by Dr. Cassidy, "That the members of the Provincial Board of Health, having given careful attention to the Report of Drs. Covernton and Yeomans on the prevalence of Typhoid Fever in Sarnia and the reported causes thereof, concur in the views of those gentlemen that, in order effectually to remove the causes that in their judgment have been the essential factors of the disease, the source of water supply, instead of being at the present spot—subject as it is to the impure waters of the bay—should be brought by conduit from Lake Huron, a distance, we are given to understand, of two miles. The waters of St. Clair river, from the west side of Point Edward, would, it is true, for a period of a few years, probably furnish a sufficiently safe supply; but as there is reason to believe that, within a comparatively short space of time, the village of Point Edward may extend to too close a proximity to the stream from whence the conduit may proceed, it would be better to fix the source at once at a point beyond reasonable doubt as to purity. The plan suggested of bringing the water from Lake Huron, would, we are aware, be attended with considerable expense, and also that of a conduit carried from the St. Clair side of the Point Edward would require to be placed at a depth sufficient to prevent its being injured by vessels at anchor, or even by vessels of deep draught passing in the course. The third proposition, namely, that of continuing the use of the sluggish water of the bay, even if the existing sources of pollution were carefully removed, could not be recommended by us from a sanitary point of view. The only way for the waters of the bay to be used with any degree of safety would be by the carrying of a main trunk drain from the head of the bay, which, in addition to carrying off the sewage from all water-closets and other

sources of pollution, should also drain the township ditch running parallel with Exmouth Street—said drain emptying below the Whirlpool. Any other expedient would in our judgment fall short of accomplishing the object which our report was intended to subserve. Dependence upon by-laws that might be enacted, however minutely and carefully they might be framed, with the object of preventing the fouling of the bay water, would, we conceive, be open to objection, as it is notorious that frequent evasions of such laws take place. Nothing short of a trunk sewer running from the head of the bay to a point at which a competent engineer would pronounce as absolutely secure from the danger of sewage being carried back by the reflex current that, it is admitted, starts from the point of land at which the tide from the American side strikes the Canadian shore, could in this case be recommended. This precise spot would of course be more likely to be correctly designated by the residents of the place than we could presume to do."

The members of the Board would also recommend that the whole system of sewerage and disposal of sewage be remodelled under the charge of a competent engineer.

ARTICLE II.

REPORT OF COMMISSION APPOINTED TO REPORT UPON THE MALARIA EPIDEMICS IN COBOCONK AND MADOC.

To the Members of the Provincial Board of Health:—

GENTLEMEN,—Your Committee having been authorized by the Government to make a visit of enquiry to the above-named places, journeyed first toward Coboconk by way of Fenelon Falls, it being necessary that the Balsam River, with its locks at Rosedale, be examined.

Having crossed the "narrows" between Balsam and Cameron Lakes by a draw-bridge, your Committee interviewed the oldest inhabitant of Rosedale, a rather remarkable old man who, amidst all the vicissitudes in the history of the place, had for sixteen years kept the village post-office with a blind energy (he was sightless) characteristic of his race and northern blood. He informed us that he had never had ague there, and that in fact he had seen much more in Mariposa, where he had previously lived, though it had been considered high, dry, and healthy. Having further interviewed another inhabitant by means of a self-sought introduction to the landlady of the village inn, your Committee found that there had been some fever in the neighbourhood last year, but none of a severe type. Indeed from the appearance of lake and narrows there was every reason to believe that Rosedale is an exceptionally healthy neighbourhood.

Driving thence some eight miles your Committee reached Coboconk, a village situated for the most part on an island in the Gull River, there being in addition houses here and there on either, but mostly on the east river bank. On the west bank there is a large saw-mill, managed by a Mr. Gould, in the interest of the Dominion Bank.

The river has a dam, at the upper end of the island in the east channel, in which there is a slide for running down timber. In the west channel there is also a dam, situated at the lower end of the island, but at a higher level than the one on the east. There is consequently but little water running over it, a lagoon in fact being formed on the west side of the island having sluggish water. When the water is drawn off at the upper dam this lagoon becomes quite shallow, and so much was this the case during the latter part of the summer of 1881 that they were unable to pump water into the mill by the pipe laid out into the river.

The question of the prevalence of malaria in Coboconk seems to be an urgent one, since, for several years past, almost every inhabitant of the village has been affected, while those living two or three miles away have been quite free from it, as were also the villagers up to two or three years after the establishment of the saw-mill on the west bank, when the ground around the mill having been covered with sawdust, the latter

was thereafter thrown into the river along its edge, and has been increasing year after year until, as your Committee was informed, the deposit is now over 100 feet cut into the river, extending up and down the bank for 100 yards or more. As a matter of course, this organic matter has decayed and is decaying, and of late years, since much bass-wood has been sawn, the stench from the decomposing sawdust has been extremely offensive.

The pretty river is situated between banks sloping gently up from the river, with limestone of the Trenton formation cropping out along it. This is the case for several miles up the river, with the exception of a small swampy place on the west bank above the mill 100 yards or more, and covering an area of five or ten acres. This swamp, however, is mostly so dry that rank vegetation, such as willows, reeds and marsh grass, covers its surface. The river below the village has the same kind of banks, and can be affected in level only to a small extent since between it and the locks at Rosedale is the wide expanse of Balsam Lake. These are the principal facts in the topography of the village. The question of causation of the malaria seems then to resolve itself into two points for consideration; (a) What influence does the small swampy area on the west bank exert?; (b) What foundation is there for the popular opinion that the decomposing sawdust is the potent agency?

Any other theory, as for instance a malarial wave from some meteoric condition, may be dismissed on the ground of the epidemic being wholly localized, and this too in a neighbourhood with a possible *causa morbi*, not elsewhere found in the vicinity.

With reference to the first possible cause it is doubtless true that, in a dry season, which would cause this low ground to become for the greater part dry, there would be conditions present which would favour the propagation of the *bacillus malariae*, or the germ of malaria, whatever that may be, in case it be once present. However, the influence of a wet season upon this swamp would not seem to be very considerable, since the height of the water during any year is largely regulated by the dams.

In any case, however, the vegetation in the swamp is so rank as to prevent in a large degree the free development of malarial germs, and moreover, whatever theory may suggest, we have the fact, as given by the inhabitants, that the dams have been on the river some twenty-five years and that this area has been swampy during all that period, but no malaria had occurred until a year or two after the saw-dust began to accumulate around the mill, and especially along the banks and in the water of the west channel.

As to whether the presence of decomposing saw-dust in large amounts is a sufficient explanation of the prevalence of malaria in this locality would seem to be beyond reasonable doubt, from the fact that its chemical composition is of much the same nature as the vegetable mould of the prairie, which when exposed to the air and decomposing is known to be the cause of the widespread prevalence of malarial diseases. In addition to this fact we have many well known instances where malaria had been practically unknown in districts until such time as the saw-dust from mills had been exposed to the action of the atmosphere for several years, when decomposing it generated gases similar to those of organic compounds in general, and forming as we must suppose a favourable *nidus* for the development of malaria germs.

At Felon Falls the saw-dust of the mills there had been spread out over the open common, and left to decompose. Malaria followed, but later on a kiln was built in which all the saw-dust has since been burned, a great decrease in the prevalence of malaria following as a result. The popular idea seems to be that basswood saw-dust is more dangerous to health than pine saw-dust. This may be true on the supposition that the turpentine and resin of the pine exerts some preservative or anti-septic influence. Again no malaria occurs along the Gull River until some sawmills, seven miles above Cobosconk, are reached, when it re-appears. The same fact has been noticed in the neighbourhood of sawmills on the river Moira, as we were informed at Madoc.

In a word we may say that decomposing sawdust is but one of the conditions under which the full development of miasmatic diseases is most readily brought about, *i. e.* if we accept the ideas in an article in the Annual Report of the Connecticut State Board of Health, which says: "All writers admit wet soil, marshy land and decaying organic substances are factors in producing malaria."

Concluding then that in these conditions we find a cause for the remarkable prevalence of malaria in the village, we naturally ask what remedies must be sought.

1st. It is evident that any permanent improvement must depend upon the disposal of the saw-dust in some other way than here adopted, such as using it for fuel for the engines of the mill or burning it in a kiln. The council of the township of Bexley has already ordered Mr. Gould, the manager of the mill, to desist from further disposing of the saw-dust in the present manner; but he has paid no heed to the commands, on the ground that Mr. Graham, the Fishery Inspector of the District, says that the present mode of disposal of the saw-dust is not contrary to the clauses of the Fishery Act, inasmuch as it is not thrown into the main stream.

As we have seen, however, the west current is as much a part of the river as the east, hence the offender can be reached under the clauses of the Fisheries Act. Moreover, should this Board support the opinion of the Local Board of Health in its belief in the effect of decomposing saw-dust in the production of malaria, if not as the cause, yet as aiding the development of the cause, this would then seem to be good reason for prosecuting Mr. Gould or the Company as "creating a nuisance" as within the meaning of the Municipal Act.

Should the present method of disposal of the saw-dust be prevented, we are not, however, to suppose that malaria diseases would cease at once, since the large amount of saw-dust already accumulated will require a considerable length of time before, under ordinary conditions, its present injurious effects will have been neutralized. It is quite possible, however, that its baneful effects would be rapidly lessened were the dam on the west side of the island either lowered or completely removed, thereby causing a rapid current to carry away more or less of the saw-dust along the bank.

According to a motion passed at the last regular meeting of the Board, your Committee was directed to take steps for the elucidation of the question of the influence of saw-dust in causing malaria.

Having procured water from the Gull River at the point where the deposits of saw-dust are made, specimens were sent to Dr. Sheard for purposes of experiment.

The following is a copy of his Report:—

REPORT OF CHARLES SHEARD, M.B., PROFESSOR OF PATHOLOGY, TRINITY SCHOOL OF MEDICINE.

To the Committee of the Provincial Board of Health:—

GENTLEMEN,—The water from Gull Lake sent me, and which I received September 25th, 1882, has been duly examined, and the following result I beg most respectfully to submit:—

The water was first placed in a tall glass cylinder, and allowed to remain for twenty-four hours at the ordinary temperature of the air, 75° F. On examining it at the end of twenty-four hours, a thick brown sediment was observed to have formed, occupying about one-fourth of the cylinder. The supernatant fluid was carefully poured off, and found to contain albumen. About half a drachm of dry albumen was obtained from six ounces of the water. On microscopic examination of the supernatant fluid, it was found to contain nothing but granules from vegetable debris and woody fibre.

A portion of the sediment left behind in the cylinder was next examined microscopically, and found to contain a large quantity of woody fibre, various specimens of vegetable cells, and also spores. A portion of the sediment was next placed in a test tube containing pure glycerine. After remaining for about half an hour the supernatant fluid was poured away, and the small portion retained was found to contain the spores almost entirely freed from woody fibre or debris. The spores thus obtained were of two distinct kinds.

(a) *Conservæ*.—Imperfectly formed but readily recognizable as purely vegetable spores and possessing low vitality.

Such spores are frequently met with in decomposing water, especially when

taken from soil overgrown with mosses or low grasses. I do not consider them of any importance apart from indicating impregnation with vegetable matter.

(b) Spores entirely different from *confervæ* or other known vegetable spores.

These I will give a detailed notice of. They were about $\frac{3}{16}$ inch in diameter, oval or circular in shape, and showing transverse markings. They were capable of spontaneous movement—the activity of their movements depending on the hygrometric condition of the atmosphere.

When kept for some time in hydrocele fluid or serous fluid at a temperature of 90° F., the activity of their movements was greatly increased. They then showed granules in their interior. Many of these granules were large and circular, resembling somewhat the developing spores seen in congregating *confervæ*.

When a small portion of the hydrocele fluid, containing the above mentioned spores, was placed in a test tube so as partially to fill it, and the test tube closed with a rubber cork and kept for twenty-four hours at a temperature varying between 80° F., and 90° F., and subsequently cooled to 40° F. or lower, the spores were found to be deposited in contact with the upper portion of the test tube, showing that with moderately high temperature they could be driven off and by a low temperature deposited again on a cold surface.

Again, on taking a few of such spores thus deposited on the tube and placing them in hydrocele fluid, kept at a temperature of 80° F. or 90° F. for from three to six days, the spores were then found to be increased in number, and large circular masses seen in them in great abundance, proving beyond a doubt the vital state of these minute animalculæ and also that with high temperatures, in a favourable medium they underwent rapid reproduction. I adopt hydrocele or any serous fluid, knowing it to be one of the best media to facilitate the reproduction of albuminoid spores, and also to avoid the introduction or origination of foreign germs from the air and other sources, which takes place when spores are kept for any time in an aqueous medium.

Two small rabbits were placed in a cage containing a portion of the sediment from water which was kept at 80 F., in order, if possible, to produce impregnation of the air with these spores, as had been done in the experiment of the test tube. The experiment was continued for two weeks, but without any influence upon the constitutional states of the rabbits.

The experiment with the rabbits was continued for two weeks, and performed in a small room about 9 x 7 feet, and was not concluded until all the water supplied, together with the sediment, was completely dried up (being about twelve ounces of water containing about four ounces of moist saw-dust sediment); and although the room was occupied by me at least three hours each day during that time I failed to show the slightest traces of malarial influence. To be brief I would sum up the results of the experiments as follows:—

1. The water is impregnated with vegetable phytozoa demonstrable by the microscope.
2. Spores were discovered capable of reproduction, movement and dissemination by means of changes in atmospheric temperature.
3. There is no absolute proof that these spores (although corresponding in some respects in their dissemination to the dissemination of malarial miasm) are capable of producing malaria.

I would also say that I strongly believe the spores mentioned to be capable of exerting zymotic influence; and am strongly of the opinion that had the amount of sediment in the water been large enough to generate a sufficient number of spores, the room in which such was kept, at a moderately high temperature, would ultimately become malarious.

I have the honour to be,

Yours faithfully,

CHARLES SHEARD, M.B.,
Professor Pathology, Trinity School, Toronto.

From Dr. Sheard's report it will be seen that no definite results can be said to have been proven; but quoting his opinion "that had the amount of sediment in the water been large enough to generate a sufficient number of spores, the room in which such was kept at a moderately high temperature would ultimately become malarious," your Committee feel that the experiments, along with the array of facts stated by them, showing the probability of the saw-dust deposits being the *vis agendi* of the malaria epidemic amply justify them in the statements and recommendations which they have made.

MADOC INVESTIGATION.

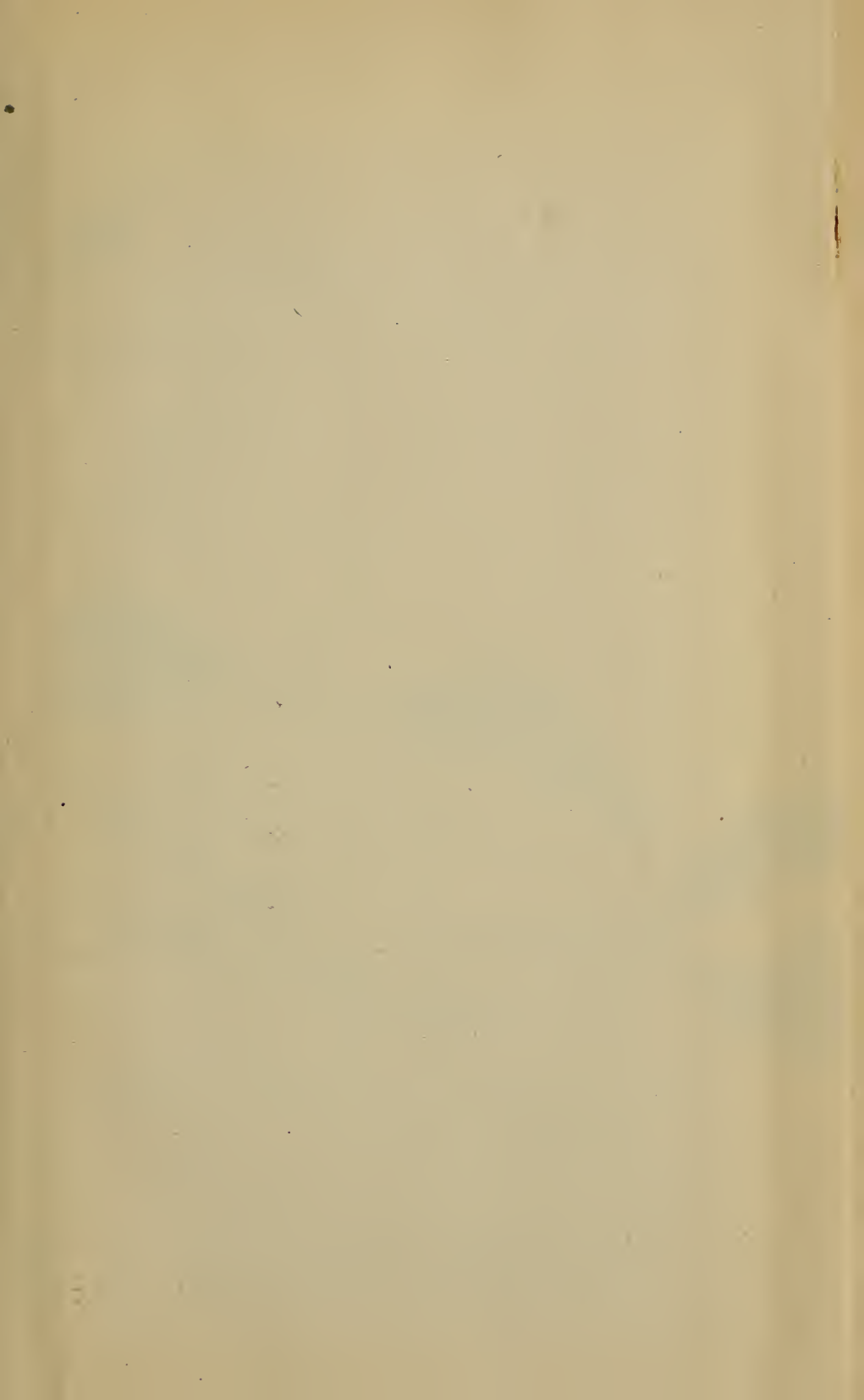
The village of Madoc, where there also exists a wide-spread epidemic of malaria, presents on the other hand another quite different phase in the question of the cause of malaria.

Before proceeding, however, to discuss the various points in the Madoc epidemic, your Committee desire to express their pleasure with and appreciation of the kind reception accorded them, not only by Mr. E. D. O'Flynn, the active and urbane Secretary of the Local Board of Health and Clerk of the village, but also by the members of the profession, Drs. Loomis, Sutton and Dafoe, as well as many others, among whom may be mentioned the Rev. Mr. Wishart and Mr. Wood, warden of the county. Every facility, in the shape of detailed information concerning the topography of the village and surroundings, was given your Committee for the pursuit of its investigations, and so completely are the villagers *en rapport* with this Board that your Committee feels assured of their aid and co-operation in whatever practical scheme may be suggested by it for the remedy of the existing state of affairs.

In order to present to this Board something like a complete idea of the problem which presented itself to your Committee, it will be necessary to give a brief *résumé* of the health of the village, in respect to malaria, during the past few years. We were informed by the Rev. Mr. Wishart, that, when in 1856 he settled in Madoc, the district was much more swampy than at present—a usual occurrence, indeed, in all our new settlements. He further remarked that, notwithstanding this, no ague prevailed for years afterwards. In the year 1877, however, a dam was built on the river below Moira Lake at (a), *vide map*; and that in that year, or the year after, ague appeared in several families living upon the island (b) in the river. These, he remarked, were very ill. This dam raised the water of the river some four feet, causing much land (c.c.c.o.) to be overflowed and to remain for several years drowned land. The lake surface that season showed the presence of much vegetable matter, many fish dying at the same time. In 1878 malaria extended itself to the settlers living south of the lake gradually during that summer, and the next spreading to the inhabitants of the village; and in 1880-81 his family, which live on elevated ground (d) were all much afflicted with it. He asserts that there had been no malaria in the district until the dam was built. Every summer has seen the water largely retreating from the drowned land and from the marshes 1.2.3 (*vide map*).

During the past years these marshes to the north and east of the village have for the most part dried up; but even with their presence in this condition there had been no malaria.

In addition to these marshes there is in the centre of the village a small mill-pond, an expansion of the two creeks which unite in it, made by a dam, situate at (e). Along the west creek is a small area of wet land now covered with rank swamp grass and willows caused by the damming back of the waters. Further, the village is situated upon the gneissoid strata of the Laurentian formation, and so has an impervious bed along which the water necessarily drains to the lower levels, as also whatever sewage may soak into the soil. The malaria area, extending itself some two miles in breadth along either bank of the river, is confined to the neighbourhood, excepting at Peterson's saw-mill, some five miles away, where a few cases were known some twelve or fifteen years ago; while at Marmora, up the river in a north and west direction with high dry river banks, malaria appeared some years later than at Madoc, and again at Doloro it has this year been as bad as last. In 1881 much of the fever was of a *typho-malarial* or *remittent* type.



Such then are the principal facts concerning the topography, and the prevalence of malaria up to the time of the enquiry by your Committee. We can readily see that the question as to what is the prime factor in the causation of malaria here is one of some difficulty, and your Committee believe that it will be found that several agencies are at work.

The village authorities have readily admitted that its sanitary condition is bad, that privy-vaults, cesspools and stables must have their fluid contents draining from the higher to the lower portions of the village, where the water is noticeably bad.

Another fact noted is that of the influence of the water of the mill-pond upon the height of that in many wells in its neighbourhood. It has been particularly noticed that the water in these wells varies in height correspondingly with that in the mill-pond. Now should the borders of the pond be, as undoubtedly from its position they might be, a favourable *nidus* for germ development it can readily be seen how the infiltration of its waters through the soil and cleavage planes of the rock might be the means of polluting the drinking water with malarial germs as well as with sewage and other organic materials. Not only this, but its area though small, is from its situation particularly favourable for the spread of its super-ambient atmosphere over the village, while the change of the water level by evaporation, and its gradual retreat leave it during summer a more or less stagnant pool with odours not at all agreeable or healthful.

The small swamps (1, 2, 3), already referred to, from their situation and condition would not seem to be in any great degree factors in explaining the presence of malaria.

We now come to what is the opinion of the majority of people in Madoc is the chief *causa morbi*, viz., the extensive surface of swamp formed by the drowned land marked c. c. c. on the map. It was still wet in many places when your Committee saw it, and abundant swamp vegetation was everywhere present. There was also much decaying timber, logs and stumps of trees, either cut, or which having been killed, have gradually fallen. The past summer having been wet, the surface of the swamp was not relieved of its surface water so much as it would have been in a season such as the dry summer of 1881, either by evaporation or the gradual falling of the river.

The river was, when seen by your Committee, within its banks, but this, we were informed, was due to its having been lowered, through the dam having in 1881 been partially blown up by some unknown person.

Now, before we suggest any possible means for remedying the evil along the Moira in this district, we have to consider in how far this swamp area has to do with the causation of malaria.

We have several apparently well ascertained facts, viz. :

1. That there is a pretty well defined area extending probably four or five miles along the river, and two or three miles back from it on either side, in which malaria prevails.

2. There is an outer area comparatively free from malaria.

3. We have the fact of the presence of small swamps near the village, and of a mill-pond in it without any epidemic of malaria having been present.

4. The building of the dam some six or seven years ago, which caused a great rise in the river, with the result that much land along the north bank was submerged for varying periods during the year.

5. That the first cases of malaria occurred on an island in the lake, and that thereafter it spread to the south of the river first, where there were no swamps to any extent.

6. That thence it extended to the north shore.

7. That since the blowing up of the dam, some months ago, the water of the river has retired within its banks, the marshes having in consequence been mostly free from much standing water, unless in the spring of the year, and the river water has become purer, and the village freer from malarial diseases, according to the report of Mr. E. D. O'Flynn, Secretary of the local Board of Health, than during any previous period since they first appeared.

These facts having apparently been completely established, we must revert to the inferences naturally to be drawn from them.

After a careful consideration of all the bearings of the question your Committee have arrived at the following conclusions:—

1. That in view of the fact that the unsanitary condition of the village from the presence of the aforesaid mill-dam and the many ill-regulated cesspools and privies, tending to pollute the air and contaminate the wells, would increase and aggravate malarial diseases, even though not causing them, it is imperatively necessary that these several sources of evil be removed.

2. That assuming from the many accumulated facts that the drowned land, from overflow caused by the building of the dam, which raised the river-water at least four feet, has been the great exciting cause of the malaria, your Committee consider that some one of the following plans might be carried out, with the intent of lessening if not wholly removing the evil.

(a) Reducing the river to its former level by the removal of the dam, thereby freeing the drowned land from the danger of overflow. This, by allowing the swamp to dry by natural processes, or better, by aiding these by drainage, would it is fair to conclude, cause malarial diseases largely to disappear—as has in a measure followed the partial blowing up of the dam.

(b) But another plan has suggested itself to your Committee, viz., the building of a dike along the whole river front of the drowned lands. This proposition is to be considered on the grounds that the Local Board of Health has informed your Committee that there would be great difficulty, in their opinion, in purchasing the mill-dam from the Trust and Loan Company of Toronto, which, they are informed, intends re-building the dam. Supposing, however, that this difficulty can be got over, another presents itself in the fact that the rear portions of three or four municipalities border on the lake, and that these being much broken, thinly settled, and hence not inclined to spend money in this direction, the village would have to bear the whole expense, which it is felt the rate-payers would not be inclined to do.

This proposition of building a dike having, however, the same and probably greater difficulties in the matter of expense, it need only be considered upon the supposition that the owners of the mill-dam, in legal possession of their right to keep up the dam, refuse to come to terms with persons wishing to purchase it.

In addition to the building of a dike, thereby keeping the flat land from being flooded, drains would be required to draw off the water from the swamp. These latter however, it is thought, could have sufficient fall only in the dry period of the summer and early autumn months.

The various practical conclusions which have suggested themselves to your Committee, were, according to the motion of this Board, transmitted by its Secretary to the local Board of Health of Madoc, with an enquiry as to what that Board thought possible to be done in the matter of remedying the evils arising from the village cesspools, privies, and the pond situated in its centre, and also as to whether any agreement could be arrived at for the purchase of the mill-dam.

The following is a copy of the letter received from E. D. O'Flynn, Esq., Secretary of Local Board of Health:—

Madoc, September 27th, 1882.

DEAR SIR,—Our energetic Board of Health have had under consideration your partial Report, under date of the 11th inst., of the causation of malarial diseases in this locality. In reply, the Board are of the opinion that they could find a remedy for questions one and two (*re* the improvement of the nuisances within the village limits) of your Report; but cannot see their way so clear to dealing with No. 3. Building a dike would be impracticable; as to purchasing the dam from the Wallbridges (previous owners) the Board has reason to believe that the property is now out of their hands, and belongs to the Trust and Loan Co., head office in Toronto; and that even if the Company were willing to sell it at a reasonable figure, there would be difficulties in the way of purchase. The village covering only a small area of that affected with malaria, and being already overtaxed would not be likely to submit to the additional burden, which the purchase of the dam would necessitate. The rear of three or four other muni-

cipalities border on the lake ; but those portions being much broken, thinly settled, and some not being noted for their liberality would, it is presumed, not be willing to share in the expense of purchase.

The ordinary height of the river, the dam being absent, would admit of sufficient fall for the drainage of the marshes. The absence of the dam would entirely remedy the evil as to question 3. Since the lowering of the dam by Prof. Dynamite a few months ago, the marshes are drained, and the water of the lake purer, and freer from miasmatic indications than at any corresponding period since the dam was built ; and it is also noticeable that within this time there has been an abatement of malarial fevers.

It is said that it is the intention of the Trust and Loan Co. to rebuild the dam, which if done and allowed to remain will be to invite the return of the Hydra-headed monster, malaria, with all its wasting and destroying influences. As the residents of this village and vicinity have been sorely tried during the past five years by a disease which like the plague that passed over ancient Egypt leaving one dead in every house ; and having being severely taxed in doctor's bills, enfeebled in health and shattered in constitution, the Board are of the opinion that it has now assumed such a serious aspect, and become so important a matter that the Government should deal with it.

Yours very sincerely,

E. D. O'FLYNN,

Secretary.

Secretary Provincial Board of Health, Toronto.

We thus see that the conclusions arrived at by the Madoc Local Board of Health force upon this Board the consideration of a very wide and important question, viz. :— Of how far it may be deemed wise to make recommendations to the Government for the introduction of legislation such as may give increased facilities for dealing with matters which affect the health of a large district of country. The questions which this investigation bring before this Board resolve themselves into the following :—

1. How far the vested rights of the individual are to become secondary to the public interest in matters of health. The principle that they are to be so considered is already affirmed so far as the question of drainage is concerned in clause 54, chap. 80, of the Revised Statutes of Ontario.

2. How far it is the duty of Municipalities to proceed, unaided by the General Government, in undertakings involving the expenditure of considerable or large sums of money in remedying evils brought upon them by the legalized acts of individuals in some cases outside of such Municipalities, or whether in cases similar to those the provisions of the clause above referred to should be brought into requisition.

3. How far it becomes incumbent upon the Government to introduce legislation whereby in municipal improvements, affecting the public health, the various neighbouring Municipalities may be called upon to assess themselves for the payment of such improvements. It seems to your Committee imperatively necessary that when private individuals and companies obtain certain grants and privileges in such matters that clauses should be inserted in their leases, deeds or charters, requiring them to build dikes or otherwise adopt such measures as may be recommended by this Board for protecting not only the property but the lives of the many whose interests are involved.

We have the honour to be your obedient servants,

J. J. CASSIDY,
PETER H. BRYCE.

ARTICLE III.

REPORT OF THE COMMISSION OF INVESTIGATION INTO THE OUTBREAK OF TYPHOID (ENTERIC) FEVER AT STRATFORD.

TORONTO, October, 20th, 1882.

To the Chairman and Members of the Provincial Board of Health.

GENTLEMEN,—On the 11th October, I was asked by your Chairman, Dr. Oldright, to investigate the cause of an outbreak of Typhoid Fever, at Stratford, Ontario. I went to Stratford next day (12th instant) and immediately placed myself in communication with the Mayor of the town, Mr. David Scrimgeour. That gentleman introduced me to Mr. Thomas Horn, Chairman of the town Board of Health, Mr. H. B. Wilson, Health Officer, Mr. Burritt, Clerk of the County Court, and some other gentlemen interested in municipal matters.

Accompanied by Mr. Burritt, I proceeded to examine one of the affluents of the River Avon, which has received the not unmerited title of "Stinking Creek." This creek flows through the town in a south-easterly direction, and receives about two-thirds of the town sewerage. A branch of this creek receives a certain number of private drains. This creek, or open sewer, has a very slight fall, and consequently the refuse matter, which is poured into it requires removal about twice a year. I was informed that the brick sewers discharge surface water, house drainage and the overflow of several cesspools into "Stinking Creek." Also that those brick sewers traverse the two principal business streets, and receive the drainage of the principle hotels, stores, etc. I was informed by Mr. Horne that recently unpleasant smells used to find entrance to the houses along these two principal streets; but since the house drains have been trapped complaints of this kind have ceased. The proprietor of "The Windsor," where I stopped, informed me that the water-closets in the hotel were flushed from a tank, that they were trapped, and that they discharged into a cesspool, which was also trapped on the house side and ventilated; also that the cesspool was drained into the street sewer, the solid excrement which sank to the bottom, being removed by night-soil men every quarter. No cases of Typhoid Fever were reported from this portion of the town.

Accompanied by the gentlemen mentioned above, I drove over to the infected portion of the town. I was informed that a large mill pond in the north-east portion of the town, which I noticed *en passant*, received only a few private drains. Arrived at the north-west end of the town I found the fever cases located in two blocks, bounded on the east by John Street, on the west by Avondale Avenue, on the north by Hibernia Street, and on the south by Norman Street. I proceeded at once to examine John Street sewer, which receives several private drains, and finally discharges into the River Avon. John Street runs in a direction 30° west of south, and ends at the river bank. This stream, the Avon, is at John Street about fifteen feet wide, from fifteen inches to two feet deep, flows with a pretty rapid current, in a south-westerly direction, and empties into the Thames about three miles north of St. Mary's. The latter town, which is the first on the stream below, is about twelve miles from Stratford. On examining the sewer I found it to consist of a square box made of oak planks and pine scantling. The oak occupied three sides of the square, the fourth side, or bottom, was occupied by the scantling, which held the frame together. These pieces of scantling necessarily impeded the force flow of sewerage and formed a number of miniature cesspools every six feet along the course of the sewer. The inside area was 2 x 2 feet. At the street corners intersecting John Street, culverts were placed leading down to the sewer. I did not observe any discharge, fluid or solid, at the mouth of the sewer. I was informed later on, that the construction of the sewer was considered faulty inasmuch as it had not been graded so as to fall steadily towards its mouth. This defect was said to arise from the fact that the height of land which bisects John Street prevents a steady fall in the sewer towards the Avon, that position to the north of the height of land finding

its natural drainage in the opposite direction. One of the workmen who had been engaged in the building of this sewer, confirmed the above statement by the remark that when the sewer was being built the water flowed back on them till they reached the height of land, after which it flowed naturally down to the stream. In opposition to this view, the Health Officer showed, by sinking a pole into the culverts, that at no place was there a greater depth of fluid in the sewer than four inches, which might be easily accounted for by the presence of the 4 x 4 scantling previously referred to. The general opinion seemed to be that above the height of land the fall, if any, was very small. I did not get the opinion of any engineer on the question, and the gentlemen who accompanied me did not furnish any other means than mere ocular inspection by which I could decide the question. I shall therefore reserve my opinion about this feature of the John Street sewer until I receive more reliable information.

I was also informed by the gentlemen already referred to, that this sewer received only surface water and house drainage; but testimony received later on from Mr. Sheriff Hossie, rebutted this; for that gentleman mentioned two instances in which, to his certain knowledge the overflow from cesspools drained into the sewer. The house drains connected with this sewer were not trapped.

Dr. D. B. Fraser informed me that he had ten cases of Typhoid Fever in this locality with no deaths. The fever was of a severe type and of the true enteric variety. He considered the foul emanations from the John Street sewer the principal cause of the disease. He stated that the untrapped drains allowed foul odours from the sewer to find entry to the dwellings and yards. Some of the drains connecting directly with the houses, others opening on the yards. In some instances there were no drains. Some of the cases in Dr. Fraser's opinion might have arisen from impure drinking water. Drs. B. M. Fraser and Robertson agreed with their fellow practitioner in referring the causation of the fever to the foul condition of the John Street sewer.

On the following morning I visited this fatal spot, where four deaths had already occurred and others were momentarily expected. The houses occupied by the sick people were clean looking cottages, surrounded by gardens. The air was pure and refreshing, all nature seemed to smile, and yet people were lying ill with a deadly disease on every side. In order to clear up as much as possible the question of causation, I selected four samples of drinking water from four different wells in the neighbourhood and ordered them to be sent by express to Mr. Heys, Analytical Chemist, of our city. I enclose his Report, which as I expected shows that the well water used by people in houses where fatal cases had occurred, contained sewerage, and was unfit for drinking purposes.

The soil in the infected locality is stiff clay with a substratum of blue clay, at a depth of eight or nine feet. The privies were in all cases near the wells, in some cases about twenty feet away.

From a consideration of all the facts of the case, I am inclined to the opinion, that the outbreak of Typhoid Fever referred to may be traced to two causes, in the foul condition of the John Street sewer and the untrapped and unventilated house drains; and the use of contaminated drinking water connected therewith. As Enteric fever has during previous years prevailed in the same locality, it is probable that the same causes have been responsible for the former outbreaks.

The following is a copy of the letter forwarded by your Committee to Thomas Horne, Esq., Chairman of the Board of Health, Stratford, to which is appended a copy of the analysis of samples of water analysed by Thomas Heys, Esq., Public Analyst:—

TORONTO, October 20th, 1882.

TO THOMAS HORNE, ESQ.,

Chairman of the Board of Health, Stratford, Ont.

SIR,—According to my promise, I telegraphed you the results of the analyses of the four samples of well-water. In Mr. Hey's opinion they all contain sewage matter, and are unfit for drinking purposes. It is quite likely that they are not peculiar in this respect, as the custom of sinking wells and privy-pits close together in the same yard is followed

pretty generally throughout the country. Still, in estimating the causes which are likely to produce Typhoid Fever, the condition of the drinking water used in the infected portion of the town, had to be considered, as outbreaks of the dreaded disease have frequently been traced to contamination of the water supply with excrementitious matter, and more particularly with the excreta of patients suffering from Typhoid Fever.

Emanations arising from choked up or badly constructed sewers are also considered causative of the disease in question, whereas fermentative changes are taking place in the sewers, and more particularly where the excreta of Typhoid Fever patients are cast into them. Therefore, when both of these causes work together in any locality, *i.e.*, when emanations from a sewer which receives the overflow from cesspools, pass unchecked into houses and yards through untrapped drains, and when drinking water, polluted by night soil, is in daily use, it is quite reasonable to expect that Typhoid Fever and kindred diseases should prevail. The poison of Typhoid Fever enters the system by the lungs or by the stomach. In endeavouring to prevent its spread, it is necessary therefore, not only to disinfect the sick room, to destroy excreta, etc., but to remove the causes of the disease, *viz.*—impure drinking water and foul sewers. In order to prevent, as far as possible, its recurrence in your town, I would recommend that the following precautions be adopted:—

1. That pure water be obtained for drinking purposes.
2. That until it has been obtained, the water used for drinking purposes be boiled and filtered.
3. That privy-pits and cess-pools be discarded for the earth-closet or some similar inexpensive plan.

N.B.—In the State of Mississippi, the earth-closet system is obligatory; the contamination of well-water is rare.

4. That the privy-pits and cesspools in the infected localities be disinfected with sulphate of iron (3 lbs. to the gallon of water), when emptied of their night-soil and filled with earth.

5. That any house drains at present in use be so trapped as to prevent the entry of sewer gas into the houses. As a temporary expedient a trap for a box drain might be constructed as per following diagram:—A, is a three inch vent tube running up to the roof by the lower wall, and preventing sewer gas from forcing the trap CC; B is a drain from the sink; CC birch trap, partially divided by a board D. The water remains in the trap CC, and prevents the gas from passing into the house.

6. That the sewer be flushed especially in dry weather.

I do not purpose to enter fully into the question of sewers in this letter, it being one which demands much consideration. The suggestions which I offer are likely to be of use if put in practice during the present emergency, and if attended to in future are calculated to prevent the return of the disease which has already proved so destructive. Hoping that with the blessing of Providence your town may be soon relieved from the dreadful scourge with which it is at present afflicted,

I remain, Sir, yours faithfully,

J. J. CASSIDY, M.D.

REPORT OF WATER ANALYSIS.

To Dr. Cassidy, Provincial Board of Health, Toronto.

DEAR SIR,—In accordance with your instructions I have made an examination of the four samples of well-water received from Stratford, Ont., marked as in margin, and beg to report as follows:—

	DOUGHERTY.	SALVAGE.	COUCH.	MIDDLEMICH.
Appearance	Slightly turbid.	Clear.	Clear.	Turbid.
Colour	Yellow.	Slight tint.	Yellow.	Slight Tint.
Odour	None.	None.	None.	None.
Total Solids ... }	37.	32.	37.	32.
Volatile matter } grains per gallon.....	13.	7.5	8.	16.
Chlorine	2.1	2.1	2.45	2.80
Free Ammonia.....	.06	.5	.60	.146
Albuminoid Ammonia..	.08	.112	.07	.10
Total Oxidizable matter. } parts per	3.20	1.60	2.00	1.60
Oxidizable Organic do . }	3.20	1.20	1.00	1.60
Nitrous Acid	None.	1.15	2.87	None.
Sulphates.....	Trace.	Trace.	Plenty.	Trace.
Phosphates	None.	Present.	None.	Trace.

I found a large amount of vegetable confervæ and spores, with water eels, in the last one, and more or less in the others. They all contain sewage matter and are unfit for drinking purposes.

Yours respectfully,

THOMAS HEYS.

ARTICLE IV.

REPORT OF THE LAMBTON MILLS COMMISSION ON THE OUTBREAK OF TYPHOID FEVER IN THAT VILLAGE.

To the Members of the Provincial Board of Health:—

GENTLEMEN,—Your Committee having been requested to investigate the outbreak of Enteric (Typhoid) fever in this place, visited the village on the 14th of November, and met there C. Smith, Esq., proprietor of the extensive woollen manufactory and Mr. Howland, by whom they were introduced to the members of the township council of Etobicoke, the Local Board of Health within whose jurisdiction lies the village of Lambton. After a short preliminary conference with these gentlemen, your Committee proceeded to make an inspection of those houses in which cases of Typhoid Fever had occurred. The village of Lambton is situated for the most part along one main road passing through the village, and crosses by a bridge the River Humber in a general east and west direction. A considerable portion of the village is situated on the slopes and at the foot of the hills on either side of the river. That portion of the village where all the severe and fatal cases of disease occurred lies near the edge of the high ground, the rear of the lots, situated on one side of the road, running completely back as far as the edge of the declivity. To make this more plain the following diagram has been prepared showing the position of the infected houses.

Your Committee first visited the house No. I., occupied by the young man Clayton, who had died, and found as will be seen, the privy situated on the edge of the embankment. The water used by this family was obtained from the well higher up the bank

and situated in the adjoining premises. Visits were then made to houses marked II. and VIII., where, at the time, were lying cases of fever—one case in No. II. and two in No. VIII. Thence they proceeded to the residence of Dr. Beattie, through whose kindness they obtained the following accurate details:—

CLASSIFICATION OF CLINICAL FACTS—AS FAR AS OBTAINED.

—	WEIR.	ASHMANS.	HUMPHRIES.	SCOTT.	ESCOURT.	VEITCH.	CLAYTON.
Taken sick.....		James, (19 Aug.) Walter, (26 Aug.)	15th Sept.	10 Sept.	Oct. 9th.	1st Sept.	10th Sept., (at Waubashene.)
Recovery		Aug. 30th.				Recovered slowly.	
Death	Nov. 13.		13th Oct.	13 Oct.	Nov. 9th.		20th Oct.
Probable time of In- oculation.....			1st Sept.	26 Aug.	26th Sept.	15th Aug.	26th Aug.
Previous condition...			Diarrhoea for preceding six weeks.				
Mucous Rales in chest		Present.	Present.				Present (family consumptive).
Hemorrhage			None.				None.
Diarrhoea		Walter.	Present.				Present.

PERIODS OF ONSET OF THE DISEASE COMPARED WITH THE RELATIVE POSITIONS
OF INFECTED HOUSES.

1. Ashmans moved out of No. VII. one week before James took sick, and 14 days before Walter sickened.
2. Weir moved into the same house, No. VII., two weeks after the moving out, viz., about 26th August, sickened in end of September.
3. Humphries, living in No. VI., sickened—(seen by doctor 15th September)—had had Diarrhoea for six weeks previously.
4. Scott sickened September 10th in No. V., probable inoculation, August 26th.
5. Escourt living in No. IV., next to Scott, sickened October 9th, died November 9th.
6. Veitch, living in No. VII., sickened 1st September.
7. Clayton, living in No. I., sickened September 10th at Waubashene, came home 24th September.

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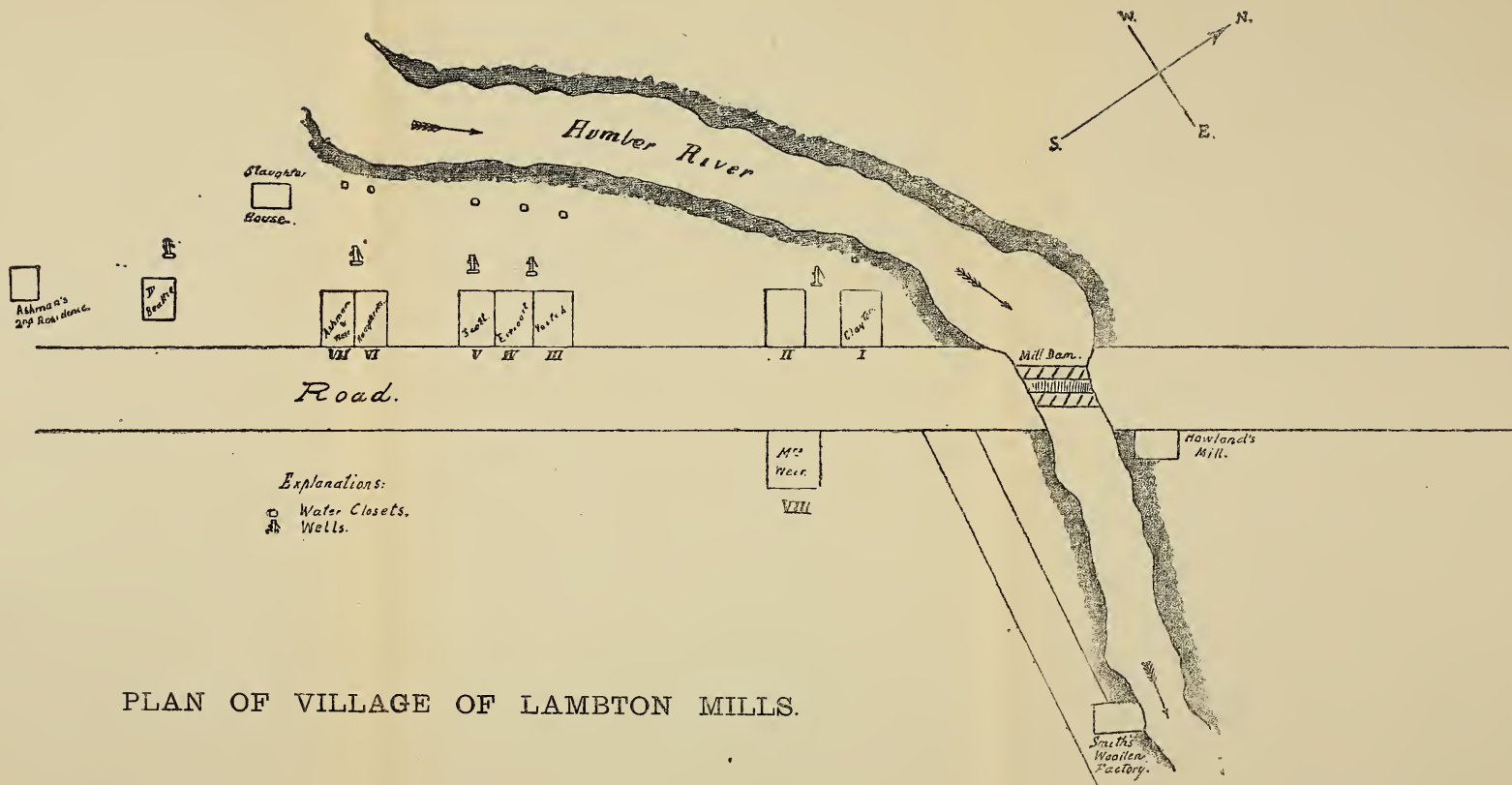
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After the consideration of all of these points, so apparently contradictory, the solution of the problem resolves itself into the three following questions :—

1st. Whether the water of the wells could in any way have been the cause, they being so favourably situated for receiving sub-soil water which had previously, as surface water, carried into the soil much organic matter from the back-yard slops which have been regularly thrown out from the houses ?



PLAN OF VILLAGE OF LAMBTON MILLS.

HOW EMPLOYED AT TIME OF ILLNESS.

1. WEIR	Came from Harriston about the last week in August ; worked in flour mill.
2. JAMES, WALTER, } ASHMAN	Worked in woollen mill as <i>finishers</i> .
3. HUMPHRIES	Worked in woollen mill as a <i>carder</i> .
4. SCOTT	A young girl of ten years.
5. ESCOURT	Worked in the woollen mill as a <i>weaver</i> .
6. VEITCH	Had for some weeks previous to illness been living in Toronto ; had previously been well.
7. CLAYTON	Came home after two weeks illness at Waubauskene.

OTHER GENERAL FACTS.

1. Some ten years ago there was a severe outbreak of Typhoid in the village.
2. Eight Cottages situated near the mill have had no cases.
3. The rag-sorters in the mill have in no case been affected with Typhoid. After the process of sorting the rags are oiled.
4. The well supplying water to houses VI. and VII., is about twenty-five feet from the houses.
5. The wells supplying V., IV., III., are some fifteen feet from the houses, and slopwater thrown out may percolate into them.
6. The cellars of all these houses are small, lined with boards, and wet in the bottom ; they have drains emptying on the edge of the bank.
7. All the privies are at the edge of the bank fifty yards distant from the houses ; excreta flow down the bank.

Such are the principal facts which your Committee was able to gather concerning this fatal epidemic. There are some rather unusual circumstances connected with the outbreak which your Committee found difficult to harmonize with any one theory of its causation.

These briefly summarized are :—

1. The first cases are not the imported cases, unless it be that of Veitch, who lived in No. III.
2. It is out of No. VII. that the first case moved one week before his illness.
3. The next case occurs in No. VI., while that in No. IV., next to Veitch's above, does not take place till October.
4. Weir moved from Harriston into No. VII., and it was not clearly ascertained whether or not he was quite healthy when he arrived ; but he seems to have worked in the mill a month before taking sick.
5. Clayton's evidently is a case bearing no relation to the others.
6. Most of those affected had been labouring in the mill, yet those of the employés in the mill most exposed to the danger of infection from rags, remained unaffected.

After the consideration of all of these points, so apparently contradictory, the solution of the problem resolves itself into the three following questions :—

- 1st. Whether the water of the wells could in any way have been the cause, they being so favourably situated for receiving sub-soil water which had previously, as surface water, carried into the soil much organic matter from the back-yard slops which have been regularly thrown out from the houses ?

2nd. Whether from the excreta from the first cases thrown into the privies, germs of Typhoid Fever may not have been borne into the air and inhaled, so causing fresh cases, and this especially in contiguous houses, the privies of which are under a common roof?

3rd. Whether the decomposing offal of the slaughter-house, so favourably situated for the dissemination of the gases and effluvia of decomposition, may not have been the chief predisposing cause, and the reason why the disease assumed such a grave character?

With regard to the first question, your Committee felt that it could not arrive at any definite conclusion until an analysis of the well-water had been made.

As to the second, your Committee thought it to be in accordance with generally received views on the causation of Typhoid Fever to assume that the disease had spread by the inhalation of germs from the excreta cast out into the privies, and from washings of the body-linen being thrown out in the yard.

As regards the third, we considered ourselves justified in stating that the odours from the slaughter-house have been a most important factor in explaining why the various cases took on such a malignant character. This conclusion would seem to be strengthened by the fact that the two brothers, Ashman, who had moved just previous to their sickness from No. VII. into a house at a considerable distance from the slaughter-house, recovered.

Your Committee having arrived at these conclusions, decided upon several recommendations which it made to the members of the Local Board of Health:—

1st. To have an analysis made of the water of the several wells, and if impure, to proscribe its use until the wells have been thoroughly cleaned, and in the meantime to use other water from known healthful sources.

2nd. That in view of the excreta from the privies on the brow of the hill being possible sources of contagion, it would be advisable to have them disinfected by solutions of Sulphate of Iron, and thereafter removed, and to have some form of dry earth system employed hereafter; and to urge the friends of persons now affected or convalescent to pay strict attention to the instructions of their medical attendants in regard to disinfection of the excreta.

3rd. That measures be taken for the immediate removal before decomposition of the offal from the offending slaughter-house; or, the removal of the slaughter-house itself from the village to some location at such distance from it as would make danger from noxious effluvia impossible.

It may be mentioned that your Committee visited the woollen factory and found proper precautions taken against danger from emanations from its water-closets—the excreta therefrom falling immediately into the swift-flowing water of the mill-race, and being thus carried away.

A sample of water from the wells before referred to was sent by the township council to Dr. Ellis, of Toronto, Public Analyst, and certain facts have been supplied by him in the following letter, which it will be well to lay before you:—

TORONTO, 30th November, 1882.

DEAR SIR,—I have examined the sample of water sent me by Mr. Evans from Lambton Mills, and find it to contain 62.2 grains of total solid matter to the gallon, including chlorides in the proportion of 9.2 grains of chlorine to the gallon. This is a very large proportion of both solids and chlorine.

The water does not appear to contain much impurity of an organic nature.

I am, Sir,

Faithfully yours,

W. H. ELLIS.

W. OLDRIGHT, Esq., M.D.,
Chairman Board of Health.

This report still leaves some suspicious circumstances in doubt: the causes of the large amount of chlorine and of total solids.

The amount of chlorine may be due to one of two causes: the sewage contamination, or the existence naturally of a large amount of chlorides in the water of the locality.

The following remarks made by Dr. C. B. Fox, a celebrated authority on water analysis, when speaking of the water from a "shallow well at B's—Gay Bowers"—will be of value by way of illustration in a comparison with the water of the wells at Lambton Mills:—

"As urine and sewage contain a large amount of chlorides, the presence of five or ten grains of chlorine per gallon in a water is a suspicious circumstance in such localities. Good natural waters contain on an average from .7 to 1.2 per gallon."

The words "in such localities" must, however, be borne in mind.

Further, in the analysis given us by Dr. Fox, the *free* and *albuminoid* ammonia he shows to be present in large amounts; while in the analysis of Lambton Mills' water Dr. Ellis informs us that organic impurity is not present to any large extent. This statement is somewhat reassuring, but not entirely so, as it may be possible for urine and slop-water percolating through the soil, (the wells have only been dug about a year), to lose much of their organic matter, and still retain chlorides and typhoid germs.

The case of the epidemic at Lausen, in Switzerland, is a notorious example of this possibility. It will be remembered that in that instance the contaminated water of an adjacent valley, after percolating through the gravelly hill intervening between this valley and the public reservoir, still retained its potency to cause a fearful epidemic of Typhoid, and retained also its chloride of sodium, although no trace could be found of granules of the finest flour which had been mixed with it.

Your Committee is therefore of opinion that the only way for the people of Lambton to be perfectly satisfied is for them to request Dr. Ellis, who had the analysis in hand, to go out and examine the water of some of the natural springs, and compare it with that of the wells, and to make such further tests, by the microscope or otherwise, as shall be necessary for the accurate determination of the question.

In the meantime your Committee believes that its recommendations have been carried out in so far as regards the disinfection of the excreta, and of course, in the analysis of the water reported above, and they trust that the other recommendations will also be followed.

All which is respectfully submitted.

P. H. BRYCE.

ARTICLE V.

REPORT REGARDING SEWERAGE, DISPOSAL OF SEWAGE, AND WATER SUPPLY IN TORONTO.

To the Members of the Provincial Board of Health:

GENTLEMEN,—Since the last meeting of the Board, it became my duty, as a citizen of Toronto residing in the neighbourhood of Sherbourne Street, and interested in the removal of certain sanitary defects in that vicinity, to attend a meeting of the Board of Works at which the question of reconstructing the Sherbourne Street sewer was to be considered. At that meeting the City Engineer and certain members of the Board broached schemes of such extent and importance to the health and well-being of the city, that I have thought it desirable for me, as your Committee on Sewerage, Disposal of Sewage, and Water Supply, to make them the subject of a special report.

Several localities in the city have become very offensive by reason of sewage discharging into channels which were originally natural watercourses, but which have now become foul open sewers. The chief of these are the University Creek, the lower portion of Garrison Creek, and an old watercourse crossing the eastern ends of Queen and King

Streets, and running down past St. Lawrence Street; one or two others of less importance might be included in the same category. In the cases of the

UNIVERSITY AND GARRISON CREEKS,

the evil has become so great that legal action is contemplated to prevent any further additions to the amount of sewerage connecting with these channels, and to remove the offensiveness which already exists. A portion of the sewage of Yorkville runs into the University Creek. A large portion of the north-western part of the city and suburbs has no provision in the way of drains for carrying off sewage and storm water, and a portion of that which is sewered has no other outfall than the Garrison Creek already referred to. These points will be better apprehended by a reference to the accompanying map which the City Engineer was so good as to furnish.

With these facts before them, those members of the Board who are not familiar with the subject of the Sewerage of Toronto will the better understand the following remarks and recommendations of the City Engineer:—

“I would recommend to the serious consideration of the Council the question of the construction of a sewer on the line of the so-called Garrison Creek, from, at all events, Queen Street to the Lake. Very strong comments have been made upon the fact of sewage being allowed to find its way into the open stream running through the University grounds, and there is no question but that steps should be taken to prevent the continuance of this, or to provide a proper means for the removal of the sewage. But if this is looked upon as a pressing necessity, surely the arguments must be strong in the case of the Garrison Creek, taking as it does in an open channel, through a built up and well populated district of the city, the drainage of a sewered area of nearly five hundred acres.”

“If the work were undertaken, it would be necessary to construct a sewer of sufficient capacity to remove all the water collecting on the area to the north draining into the valley of the stream, and it would be proposed to make the outfall into the Lake to the west of the Old Fort. By adopting this outfall, the present winding channel towards Bathurst Street, and amongst the various railway tracks, would be entirely got rid of; and it is thought beyond question that the Railway Companies would be willing to contribute well towards such a work, since it would relieve them from all fear of flooding, and do away with the present network of wooden culverts amongst the tracks.

“In the very near future, drainage will have to be provided for the newly laid out lands lying between Bathurst Street and the present western limit of the City; and it is thought not unreasonable to look forward at no very distant date, in connection with the proposed extension of the City limits, to the building up more or less thickly of the whole area north of Bloor Street. The natural lie of the ground in both these cases will necessitate, it is considered, the construction of a Main Trunk Sewer through the valley of the Garrison Creek, north of Queen Street.

“The present sewers running north and south, with their outlets, are taxed to their utmost limit, as evidenced by the flooding on Queen, Bathurst, and other streets at certain times, and the frequency of these floodings will be increased as the localities become more thickly built up, paved, and drained, by which the rainfall is concentrated and thrown more rapidly upon the sewers.

“By the construction of a Main Trunk Sewer through the valley of the Garrison Creek, an outlet would be secured for intercepting sewers along Bloor Street, one from the western City limit and the other from the east at the University Creek, cutting off all the water to the north; and a way would also be provided for intercepting along College Street the sewers running north and south between Queen and Bloor Streets, when the necessity for such arises.”

The condition of the

SHERBOURNE STREET SEWER

and its vicinity has been more than once a subject of reports from the City Engineer and other officials. In his last report the Engineer thus referred to it:—“The Sherbourne Street Sewer, between Queen and King Streets, as at present constructed, is

not of sufficient depth to intercept the stream that crosses the street near Britain Street—the stream passes under the sewer. I am of opinion that sooner or later this will cause trouble and loss, besides being, from a sanitary point of view, indefensible.” Your Committee would add that this little streamlet (once large enough to allow of the passage of row-boats from the Bay, it is believed), discharges itself in ordinary times through a half-choked box drain; but it has on several occasions become dammed back so as to convert back yards and gardens into green stagnant pools, highly suggestive of low fever, and rendered more unhealthy by soakage of made soil. This is in the heart of one of the most thickly populated districts of the city. A by-law to construct a sewer to remedy this unsanitary condition was a short time ago defeated by the selfishness of a few property-owners, coupled with the forgetfulness of the great majority, and their ignorance of the condition referred to, the question not having been canvassed to the same extent as the merits of the candidates at the late election. The small vote cast being no indication of the wishes of the property-owners, it is to be hoped that the City Fathers will be able to solve this difficulty and provide for the reconstruction of the sewer on sanitary grounds, and also that means may be taken to obtain in future a more reliable indication of the feeling of the people.

THE ST. LAWRENCE STREET NUISANCE

is being turned into a proper channel. Various portions of this eastern district lie very low, and are often filled with stagnant water. They will need to be raised by a system of filling in and drainage. Much low fever results from their present condition.

As your Committee, I would recommend that the Board endeavour, in every way in its power, to strengthen the hands of the City Engineer in effecting the sanitary reforms which he recommends in connection with these sewers, and in doing away with the reeking abominations of which complaint is so justly made. The scheme for the construction of the Garrison Creek and Bloor Street sewers will require all the support possible from those interested in sanitary reform; otherwise the selfish and ignorant activity of a few individuals scattered over the other portions of the city may serve to defeat it. I say ignorant, for they will no doubt ignore the fact that the condition of the western portion of the city will, in time, become a source of danger to themselves.

I know that you will be pleased to see that the City Engineer has, in connection with his department, made a recommendation, the substance of which has already been discussed and approved by members of this Board. It will be found in page 9 of his report as follows:—“With regard to the

DRAINS LAID FROM PRIVATE PREMISES

to connect with the sewers, I do not consider the present system of carrying on the work at all satisfactory, nor calculated to insure that thoroughness of construction which is absolutely necessary, and without which the most carefully considered specifications are of little avail. I would, therefore, beg to make the following suggestions as to the future carrying on of this work:—

“That none but those immediately under the control of the corporation be permitted to carry out this work, and that the whole of the work from beginning to end be carried on under the supervision of a competent and responsible inspector, who shall see the connection with the sewer and every joint made. This may add a trifle to the cost of the work, but its importance from a sanitary point of view cannot be over estimated; and care in the filling up of the trenches and the restoration of the roadway would be insured.” Your Committee would recommend that this inspection go further, and extend to the inside drainage and plumbing work of houses, as is now the case in many other cities, the latest of which is Jackson, Florida. Your Committee would respectfully draw the attention of the members of the Board to the

SYSTEM OF PLUMBING REGULATIONS

lately enacted there, and which may be found in one of the June numbers of the *Sanitary Engineer*, being page 29 of the current volume. Montreal has also recently taken

action in the same direction. It is to be hoped that the cities of Ontario, with its boasted intelligence, will not be the last to adopt similar measures of sanitary protection. Your Committee could now take members of the Board to houses where there is a direct communication from the sewer into the interior of inhabited houses, pipes emitting by open mouths the sewer gases into the houses. Your Committee can show you in the City Hall pipes bringing drain and water-closet gases into the apartments they are intended to ventilate; and numerous instances in which untrapped pipes conveyed, and some in which they still convey, gases from the foul receivers of water-closets into the bathrooms of houses. The persons occupying these houses have been the innocent victims of diseases resulting from these defects. In some instances death has been the result. Surely it would pay as well, and be quite as humane and sensible, to have a competent inspector to see that in houses in course of erection death does not lurk in the drains and pipes, as it does to have a coroner contemplate the result.

Your Committee would also recommend that the Board and the individual members of it endeavour to secure the adoption of the plan of

VENTILATING SEWERS OVERHEAD,

all house drains being provided with ventilating tubes, leading the gases up over the roof and clear of all doors, windows, chimneys, or other apertures of the houses. This course is now being adopted by many of the architects of the city; but to be of service in relieving the sewers of the presence of gas, and to prevent it being discharged at out feet in the streets, it must be made general. I do not wish to lengthen this report by now combatting difficulties in effecting this result. At some future time I may be permitted to show that the scheme is the cheapest and most feasible and efficacious that can be adopted.

Your Committee is aware that the attention of the members of the Board has been much occupied with the unsatisfactory mode now so common in the disposal of excreta. I refer to the

EXISTENCE OF PRIVY PITS,

with their decomposing masses of filth, sending disease germs through the atmosphere, deteriorating the air we breathe, poisoning the soil of our habitations, and rendering our wells dangerous to use. The existence of these pits and the condition in which they are kept may be stated as one of the causes of the large amount of Typhoid Fever that has prevailed.

THE FOULING OF THE WELLS

from this and other sources (surface water, garbage, and other sources of soil pollution) seems to prevail after a time in most large communities, but in Toronto the shelving clay substratum which underlies the more porous surface soil is well known to facilitate the admixture of privy water, back-yard slops, etc., with the contents of the wells. In most wells, indeed, the water which has been filtering down through the polluted surface soil is the source of supply. It has been a matter of regret to your Committee, knowing these facts, that by-laws for extending the water mains of the city have been defeated. The same remarks as were made in speaking of the Sherbourne Street sewer will apply here. And further, the

PRESENT CONDITION OF THE CITY WATER

may have something to do with this result. The City Engineer has, however, strong hopes that in August we shall be drawing our water from the Lake; and this time his hopes seem to be justified by what has been accomplished in the prosecution of the works, accounts of which have recently been published in the city press. I am glad to be able to report that steps have been taken to further secure the supply against commingling with the contaminated water of the bay. The wells on the wharf—the pumping well and inlet crib—are both being lined with stout iron casings well jointed

and secured in every way from leakage from the outside. You are aware that the pipe across the Bay has been frequently tested ; these tests will be continued. As soon as all is in readiness to convey water from the Lake, the pipe leading up through the cut to the Lake will, we are assured by the Engineer, be overhauled and tested as to its integrity. Without assuming the prophetic rôle, it may be well here to say that even after we get good safe water from the Lake, people may often need to be assured that slight turbidity, and the presence of a little clay and sand, are not evidences that water is bad in a sanitary point of view.

I have now drawn your attention to those points in connection with the Sewerage, Sewage, and Water Supply of Toronto which I thought the Board could profitably take action upon at the present time, and I have endeavoured to do so as briefly as possible. I would merely mention in addition two other schemes which the City Engineer has in view for some future time. The subject of

A LARGE SEWER ALONG THE CITY FRONT

to relieve the Bay of the filth daily poured into it is not a new one. The plans formerly proposed, however, were on the one hand to discharge it into Ashbridge's Bay, and on the other hand to connect it with the proposed new channel for the Don. Both these positions would be too near to the source of our water supply, Ashbridge's Bay would be converted into a foul pond, and there are other objections into which I need not now enter in detail. The Engineer hopes eventually to carry such a sewer out into deep water at a point about six and a-half miles east of the mouth of the water supply pipe, and to provide intercepting tanks to catch the more solid portions of the contents of the sewers, which can then be dealt with by the various processes known to the members of the Board. When this scheme is carried into effect it is to be hoped we will be relieved of the nuisance so often complained of as emanating from the.

SEWAGE OF THE CATTLE BYRES

near the marsh. It will also be a matter of interest to the Water Works Committee and residents of Parkdale that so large an amount of sewage should cease to be poured along the water front.

In connection with this subject we must remember that in abolishing privy pits, whatever may be finally resolved as to the dry system of removal, some increased amount of work will be laid on the sewers, and the foulness of the Bay increased to an extent even beyond the proportion necessarily entailed by an increase of population.

The other scheme is one for carrying the

SEWAGE OF THE DISTRICTS NORTH OF THE CEMETERY AND NECROPOLIS GULLIES

down to meet the Main Front Sewer of which I have been speaking, thereby relieving the sluggish Don of what would otherwise be poured into it.

Although these subjects are not ready for immediate action it is well that we should bear them in mind.

From the report of the City Engineer, copies of which I have placed in the hands of members of the Board, it will be seen that many of the sewers are very much silted up with mud, sand, and sewage, and are otherwise in a bad condition. A list of these is given. It is a matter of congratulation to know that the City Engineer is endeavouring to rectify these one after another.

All which is respectfully submitted.

WM. OLDRIGHT.

Toronto, June 27th, 1882.

APPENDIX E.

ARTICLE I.

REPORT OF THE COMMITTEE ON AN IMMIGRANT INSPECTION SERVICE.

To the Chairman and Members of the Provincial Board of Health of Ontario :

GENTLEMEN,—Your special Committee, appointed to consider and submit a plan for the medical inspection of immigrants, begs most respectfully to report that evidences of Small-pox, Scarlet Fever and other contagious diseases, are of frequent occurrence in the cities, towns and villages of this Dominion; and that, in many instances, the origin of such epidemics is directly or indirectly traceable to contagion, communicated by contact with immigrants coming into the country to settle here, or passing through it on their way westward to the United States, or to our North-West Territories.

Your Committee is strongly of the opinion that much, if not all, of the diseases thus originated could be prevented, and the consequent anxiety, inconvenience, expense and loss of life thus entailed removed, if a proper and judicious system of immigrant inspection at suitable points was established and effectively carried out.

It is quite apparent that the attainment of so desirable an object is beset with many difficulties. In order that the inspection might be generally useful and successful, and that the expenses connected therewith might be fairly distributed over the entire country, it would be necessary that the inspectors be appointed, and the expense of the inspection be borne by the Dominion Government. The cordial and active co-operation of our leading trunk railway lines and ocean steam navigation companies, engaged in carrying immigrants, would also be necessary in order that every facility might be afforded for making the inspection as complete as possible, and for having it performed without any necessary delay on the route.

The different steamship companies engaged in carrying immigrants to the port of New York, with unimportant exceptions, and many of the leading railways in the United States, have agreed to co-operate in a system of immigrant inspection; and the following plan has been adopted by the National Board of Health of the United States, and is now in operation :

The surgeon of the ship commences his inspection as soon as his vessel leaves the European port, and he furnishes each person upon whom he finds marks of successful vaccination with a *Protection Card* or *Pass*, and he proceeds forthwith to vaccinate all persons who have not been vaccinated, and as soon as such vaccination has been successful, he furnishes all persons so vaccinated with a similar card. This card is of a convenient size, and has on the one side of it the name of the steamship, the word, *Protected*, and the signature of the surgeon of such ship; and on the other side the words, *Pass; keep this card to prevent detention at quarantine and on railways in the United States*. These cards are not taken up at the port of entry, but are retained by the immigrants, and serve as passports at points along the railway lines where inspections are made. Inspections are made at the port where the immigrant lands, and at such distributing points inland along the leading railways as may be deemed necessary. The Inspectors are all appointed and paid by the National Board of Health, under the authority of the general Government of the United States. The Federal Government also erects and maintains suitable temporary hospitals on the borders of States, and at such other places as may be necessary for the reception and care of persons whom it may be necessary for the Inspectors, in the discharge of their duties, to cause to be removed from railway trains, or other public conveyances, on account of their being attacked with Small-pox during the journey. Such persons are maintained and treated in these hospitals at the expense of the National Board of Health, or Federal Govern-

ment, until sufficiently recovered, and in a condition to be allowed by the Inspectors to proceed on their journey without danger to the public health.

Now, if some plan similar to this were adopted by our Dominion Government, and Inspectors appointed to make inspections at our principal ports where immigrants are landed, and at a few points on our leading railways; and if our ocean steamship lines, trunk lines of railway and local health authorities would actively co-operate and assist in carrying out the details of it, the expense to the Government need not necessarily be very great, and there is no doubt that the amount of benefit resulting from such inspection would far more than compensate for the outlay involved.

In the meantime, and until some steps be taken by the Dominion Government, your Committee would recommend that an inspection be made at Toronto, and at such points of entrance into this Province as may be deemed necessary in order to guard as far as possible against the introduction and propagation of Small-pox, Scarlet Fever, and other contagious diseases.

If any cases of Small-pox, Scarlet Fever, or other contagious diseases, should be found on board any railway train, or other public conveyance, they should at once be removed, and cared for in an *isolated* place until pronounced, by a competent person, to be in a condition to proceed on the journey without danger to the public health. Should any Inspector have reason to suspect the outbreak of Small-pox, Scarlet Fever, or other contagious disease on board any train, he should telegraph to the health authorities along the route of travel, in order that they might be all the more vigilant to detect and isolate any such case or cases, as soon as the disease makes its appearance. All inspections on railways should be made, where at all possible, on board of trains while in motion, so that no delay or detention be entailed on the immigrants while proceeding to their destination.

The expenses incident to such inspection would, until the establishment of a *national* system of inspection by the Dominion Government, be necessarily borne by the Ontario Government.

In regard to the expenses incurred in maintaining patients, whom it might be necessary to remove from trains while *in transitu*, your Committee would recommend either that they be *pooled* and divided *pro rata* at the end of the year, or other fixed period, amongst the Governments of the Countries or Provinces, according to the number of immigrants who settle in each; or that the expense incurred in the case of each individual immigrant might be refunded by the Government of the Country or Province in which such person intended to settle—the destination to be decided by the *ticket* of the individual.

All of which is respectfully submitted.

FRANCIS RAE.

APPENDIX F.

ARTICLE I.

REPORT OF THE COMMITTEE UPON DISEASE REPORTS.

To the Provincial Board of Health of Ontario:

GENTLEMEN,—Your Committee appointed “to consider the best and most economical scheme for obtaining reports of diseases prevailing in various parts of the Province,” begs leave to report as follows:

The Chairman of your Committee waited upon the Hon. A. S. Hardy, Provincial Secretary, to ascertain whether the same concessions were likely to be obtained in regard to postage on statistics of disease, as now exist in regard to births, marriages and deaths. The matter is not yet definitely settled, but your Committee are glad to

be able to report that they have strong hopes that the said concession will be made. They believe, further, that the question will soon be decided; and whilst they would recommend that a scheme of disease reports be put in operation with as little delay as possible, they think it would be advisable to wait a few weeks, if necessary, for the said decision, as upon it will depend, to some extent, the number of reports it will be desirable to obtain.

The Chairman also had interviews with Mr. Charles Carpmael, M.A., F.R.A.S., Superintendent of the Meteorological Observatory, and with Mr. Thos. Monk, formerly connected with the Observatory.

Mr. Carpmael expressed his willingness to aid the scheme, by allowing the Board to make use of the reports received at his office, and by any other means in his power.

At present daily observations are reported from a few places equally distributed throughout the Province, and weekly and monthly reports from a larger number.

The points of meteorological interest reported upon vary in the different groups.

No observations have hitherto been made of the amount of ozone in the air. This has probably been due to the difficulty in cities that other gases interfere with the ozone tests; but your Committee are of opinion that Mr. Carpmael would be willing to institute such observations.

The Committee would take this opportunity of referring to the praiseworthy efforts of Mr. Monk, in endeavouring to collect information in regard to this subject, and of thanking him for offers of assistance, by making available to the Association anything he has already done, or any information obtained.

Your Committee would recommend that weekly reports be obtained, and that a request be made that no gentleman undertake to report unless he be able and willing to do so regularly every week, when not absent from home; and that it be suggested that he appoint a substitute to report from his locality, if he be absent.

It is further recommended that the following list of diseases be printed in the blank forms for reporting upon, a space being left for the addition of any others, which the reporter may deem of importance to be noted :—

Asthma (Spasmodic).
 Anæmia.
 Accidents (Railroad, Machinery, etc.)
 Blood Poisoning.
 Bright's Disease.
 Brain, Inflammation of
 Bronchitis.
 Calculus.
 Cerebro-Spinal Meningitis.
 Cholera Infantum.
 Cholera Morbus.
 Consumption, Pulmonary.
 Croup, Membranous.
 Diphtheria.
 Diarrhœa.
 Dysentery.
 Erysipelas.
 Fever, Intermittent.
 Fever, Enteric.
 Fever, Typho-malarial.

Goitre.
 Gonorrhœa.
 Heart Disease, Organic.
 Influenza.
 Insanity.
 Measles.
 Mumps.
 Neuralgia.
 Peritonitis (non-puerperal).
 Pneumonia.
 Pleurisy.
 Puerperal Fever.
 Rheumatism.
 Scarlatina.
 Small-pox.
 Syphilis.
 Tonsillitis.
 Tubercular Disease (other than pulmonary).
 Whooping Cough.

That the reports of the various diseases refer in separate columns to the number of cases attended during the week, the severity, and the relative order of prevalence: the severity to be marked by (+) plus; (=) equal, or (−) minus signs respectively, according as the cases, taken as a whole, have been of unusual, average, or less than average severity. The number, "1," in order of prevalence column, will indicate that there have been more cases of the disease opposite to which it stands than of any other.

"2" will indicate that of which there has been the next greatest number, and so on, as shewn in a blank form hereto annexed, issued by the Michigan State Board of Health:

Diseases in
(¹²³ Please Date.)
week ending Sat., 188

No.	DISEASES.	Prevalence. Order. Sec a	Severity. Sec b.	Cases
<p>a. Please mark the disease of which there is the greatest number of cases, 1; the disease having next greatest number of cases, 2; the next 3; and so on for each disease, writing the same figures opposite diseases having the same number of cases. Write 0 opposite diseases not present. A blank indicates that the item has been overlooked.</p> <p>b. The sign + indicates the usual severity, - indicates more, -- indicates less than the usual severity. Please mark this, SIGNED and DATED, as soon as convenient after close of week specified.</p>	Asthma (Spasmodic) .....	.....	.....	.....
	Anemia .....	.....	.....	.....
	Accidents (Railroad, Machinery, etc.).....	.....	.....	.....
	Blood Poisoning .....	.....	.....	.....
	Bright's Disease .....	.....	.....	.....
	Brain, Inflammation of.....	..... 4 .....	..... + .....	..... 1 1
	Bronchitis .....	..... 3 .....	..... = .....	..... 2
	Calculus .....	.....	.....	.....
	Cerebro-Spinal Meningitis .....	.....	.....	.....
	Cholera Infantum.....	.....	.....	.....
	Cholera Morbus.....	.....	.....	.....
	Consumption, Pulmonary .....	.....	.....	.....
	Croup, Membranous .....	.....	.....	.....
	Diphtheria .....	..... 2 .....	..... + .....	..... 4
	Diarrhoea.....	..... 2 .....	..... = .....	..... 4
	Dysentery .....	.....	.....	.....
	Erysipelas .....	.....	.....	.....
	Fever, Intermittent.....	.....	.....	.....
	Fever, Enteric .....	.....	.....	.....
	Fever, Typho-malarial .....	.....	.....	.....
	Gottre .....	.....	.....	.....
	Gonorrhoea .....	.....	.....	.....
	Heart Disease, Organic.....	.....	.....	.....
	Influenza .....	.....	.....	.....
	Insanity .....	.....	.....	.....
	Measles .....	..... 1 .....	..... = .....	..... 6
	Mumps .....	.....	.....	.....
	Neuralgia .....	.....	.....	.....
	Peritonitis (non-puerperal) .....	.....	.....	.....
	Pneumonia .....	.....	.....	.....
	Pleurisy .....	.....	.....	.....
	Puerperal Fever .....	.....	.....	.....
	Rheumatism .....	.....	.....	.....
	Scarlatina .....	.....	.....	.....
	Small-pox .....	.....	.....	.....
	Syphilis .....	.....	.....	.....
	Tonsillitis.....	.....	.....	.....
	Tubercular Disease (other than pulmon'y) .....	.....	.....	.....
	Whooping Cough .....	.....	.....	.....

, M.D.

Your Committee would recommend that a blotter, corresponding to the Blank Report, be presented to each gentleman reporting.

That compilations be made by the Secretary, acting in concert with the Committee on Vital Statistics and Climatology.

That there be a weekly compilation in which shall be stated in tabular form:—

1. The number of persons reporting for the week.
2. The total order of the diseases reported.
3. Their average number.
4. The extent in order of the areas over which they prevail.
5. The average severity, and the degree of plus or minus might here be qualified by numerals.
6. Increase or decrease of severity, as compared with previous week.

7. The number and percentage of observers reporting each disease.

8. Your Committee are of opinion that it would be well to recapitulate contagious diseases in a group by themselves.

To this weekly compilation may be added any other points, or any remarks, that may be thought of immediate interest or profit.

The principal meteorological features of the week, temperature, humidity, rain-fall, winds, ozone, should be noticed, and occasionally, perhaps, barometric pressure and cloudiness may have to be referred to.

So much of the above weekly compilation as may be thought of immediate interest should be published in newspapers in various parts of the Province.

Differences in types and prevalence of disease may at times render it desirable that different compilations for different districts should be made.

In this connection your Committee would state that they consider it very undesirable that undue publicity should be given to facts which would militate against the good name of any locality; the Board should take all possible means to lessen the sickness rate in any place, but it should be done in such a way as not to create unnecessary alarm, or deter those interested from sending in reports.

Warnings may often be given in general terms which will cause people to adopt precautions which they should in any case employ at all times.

Annual Reports of a more elaborate nature, and embracing researches on the causation of special forms of disease, should also be made. Of this kind of work some excellent examples are to be found in the Reports of the Michigan State Board, and in those of some institutions of Great Britain.

During the short period of Mr. Monck's investigation also, a few diagrams illustrative of the work, on a small scale, were made, and are in the possession of your Committee.

Your Committee would recommend that when the first blanks are sent out, a blank form be also sent for the purpose of obtaining information from the practitioners of the Province regarding causes of disease, and matters connected with vital statistics, such as it was intended to send out under the auspices of the Ontario Medical Association, before the formation of this Board.

Your Committee would also recommend that correspondence be inaugurated with the various Division, County, City and other Medical Societies, with the same object in view; also with Superintendents of Hospitals and Asylums, and with other persons and institutions in the Province and elsewhere.

All which is respectfully submitted.

CHARLES WM. COVERNTON,
JOHN J. CASSIDY,
WM. OLDRIGHT.

ARTICLE II.

COPY OF LETTER INVITING CORRESPONDENCE.

OFFICE OF THE PROVINCIAL BOARD OF HEALTH,
TORONTO, July 17th, 1882.

DEAR DOCTOR,—You may have observed that the Provincial Board of Health, in common with many Boards in the United States, has decided upon publishing a Weekly Report of disease prevailing in the different parts of the Province, noting, at the same time, the accompanying meteorological and other conditions.

In order to make such reports of any real value in investigating the causes of disease, it will be necessary for the Board to appoint, in various localities, correspondents whose weekly returns may enable it to deduce practical conclusions therefrom.

To this end the Board has addressed this letter to a number of medical practitioners throughout the Province, and it requests you to consider whether you will accept the position of correspondent to the Board from your district.

Leaving out of view the bearing of the proposed work upon the question of Sanitary Science, and looking at it from a purely professional standpoint, the investigations to be

made as to the causes and nature of disease will be as important to medical practitioners as many others in which they are engaged and to which they gladly devote more time. The filling up of the blank forms will require only a few minutes each week; and should you be willing to devote that time to it, be kind enough to inform the Secretary at once, so that there may be sent to you stamped forms similar to the one enclosed, and a blotter for your convenience and subsequent reference. Should you decide that you cannot do so, you will confer a favour by informing the Board of some medical practitioner in your locality who, in your opinion, would be willing to undertake the work.

The reports and remarks of correspondents will be treated as confidential, a general average of all the reports being published, and the Board exercising discretion in mentioning the names of particular localities.

Although this work, like that of the Meteorological Reporters in Ontario and of the Disease Reporters in many States of the Union, is done gratuitously, yet this Board trusts that the measure of good accruing from this scheme will be such as to encourage it to expect, in the near future, greater pecuniary facilities for making the reports, and the results to be obtained therefrom more nearly perfect.

Trusting that you may find it convenient to co-operate with the Board in this matter,

I have the honour to be, Sir,

Your obedient servant,

P. H. BRYCE,

Secretary.

ARTICLE III.

DIRECTIONS TO CORRESPONDENTS.

No. 8.

OFFICE OF THE SECRETARY OF THE PROVINCIAL BOARD OF HEALTH,

TORONTO, September 11th, 1882.

To the Correspondents of the Provincial Board of Health :

GENTLEMEN,—In order that the Disease Reports from this Board may be as uniform and accurate as possible it has been thought advisable to forward to its correspondents, along with the stamped blanks, the following explanations regarding the

FORM OF PROCEDURE IN MAKING THE REPORTS OF DISEASES,

which have occurred in their practice during each preceding week.

1. In the column headed "Prevalence, Order," write the figure 1 opposite the disease of which there is the greatest number of cases; opposite that of which there is the next greatest number of cases, write the figure 2; opposite that of which there is the next greatest number, write 3; and thus, according to the number of cases of each disease, apply consecutive numbers to all the diseases of which there have been cases during the week for which the report is made—remembering, however, that two or more diseases of which there is the same number of cases should be marked with the same figure.

2. Write 0 opposite each disease mentioned of which there is no case. A blank indicates that the item has been overlooked; and a blank cannot therefore be compiled as a statement that there was no case of the given disease.

3. Between the lowest and highest numbers used in the "order of prevalence" column, no number should be omitted, though some numbers will necessarily be repeated, when there is an equal "prevalence" of different diseases.

4. Some figure should be written opposite every disease mentioned. Two diseases should not be connected by a brace opposite one figure, as this would lead to confusion and inaccuracy in compiling the reports.

5. The numbers given in the "order of prevalence" column do not show whether a disease is more or less than "usually" prevalent, or more or less prevalent than during the preceding week. Of a disease that had been marked "3" or lower in order of prevalence one week, there might be fewer cases the following week, and yet it might have

risen to "1" in order of prevalence, because other diseases had decreased more rapidly or had disappeared altogether.

6. The numbers in the "order of prevalence" column have reference only to the relative number of cases and have nothing to do with the severity, malignancy, importance, or fatality of a disease. They do not *state* the number of cases, but show simply of what diseases there were the *most* cases during the week for which the report is made, of what disease the *next highest* number, and so on.

7. To insure, as nearly as possible, accuracy, it is thought best to note the total number of cases which the correspondent knows as actually existing in his practice; but, in order to prevent inaccurate reports, care must be taken that cases are not reported after they have passed from under the oversight of the correspondent. This is especially liable to occur in the case of chronic diseases, serving thereby to exaggerate their prevalence.

8. The observer will please report the *number of cases* for the week in the column headed "cases," on the right-hand *margin* of the card.

9. The following shows the correct marking in the "order of prevalence" column, when the number of cases is as given on the margin of the card :

Diseases in.....

(~~15~~ Please Date.)

week ending Sat.,.....

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No.	DISEASES.	Prevalence. Order. See a	Severity See h.	Cases
<p>a. Please mark the disease of which there is the greatest number of cases, 1; the disease having next greatest number of cases, 2; the next, 3; and so on for each disease, writing the same figures opposite diseases having the same number of cases. Write 0 opposite diseases not present. A blank indicates that the item has been omitted.</p> <p>b. The sign + indicates the usual severity, + indicates more, — indicates less than the usual severity. Please mark this, SIGNED and DATED, as soon as convenient after close of week specified.</p>	Asthma (Spasmodic)	0	0
	Anemia	0	.....	0
	Accidents (Railroad, Machinery, etc.)....	14	—	5
	Blood Poisoning	0	.....	0
	Bright's Disease	0	.....	0
	Brain, Inflammation of.....	18	+	1
	Bronchitis	11	—	8
	Calculus	0	.....	0
	Cerebro-Spinal Meningitis	0	.....	0
	Cholera Infantum.....	8	—	11
	Cholera Morbus.....	10	+	9
	Consumption, Pulmonary	10	—	9
	Croup, Membranous	12	+	7
	Diphtheria	5	—	14
	Diarrhoea	3	—	16
	Dysentery	8	+	11
	Erysipelas	13	—	6
	Fever, Intermittent.....	2	+	13
	Fever, Enteric	15	+	4
	Fever, Typho-malarial	9	+	10
	Goitre	0	.....	0
	Gonorrhoea	16	—	3
	Heart Disease, Organic... ..	0	.....	0
	Influenza	7	—	12
	Insanity	0	.....	0
	Measles	1	—	20
	Mumps	6	+	13
	Neuralgia	14	+	5
	Peritonitis (non-puerperal)	17	—	2
	Pneumonia	9	—	10
	Pleurisy	0	.....	0
	Puerperal Fever	0	.....	0
	Rheumatism	6	+	13
	Scarlatina	4	+	15
	Small-pox	0	.....	0
	Syphilis	0	.....	0
	Tonsillitis.....	11	—	8
	Tubercular Disease (other than pulmon'y)	0	.....	0
	Whooping Cough	0	.....	0

10. In the column headed "Severity," the sign "=" denotes that the disease is of the usual severity; the sign "+" denotes more, and the sign "-" less than the usual severity. It is desirable that this column be filled.

11. It is believed that it will be interesting and profitable to the correspondent to have a classified record of his practice week by week to which he may refer at any future time. This is one object in supplying record books. They will also prove of use by enabling the correspondent to send a duplicate of any report that may have been lost in transmission, or to examine into any supposed error.

12. If by any means the postal blanks be mislaid, or anything occurs which would interrupt the weekly reports, timely notice should be given to this office, so that, if possible to prevent it, no break may occur. When an observer is to be absent from home for a short time, it would be well for him to request some other practitioner to make and forward the reports during his absence.

13. The name of the observer, the locality from which the report is made, and the week for which it is a report, should be stated on every card.

14. In order to enable the central office always to know and be able to report the condition of the public health throughout the Province, the weekly reports should be sent as soon as possible after the close of the week for which they are made; but no report should be sent before the close of the week for which it is a report.

Should experience suggest to any of the correspondents of the Board improvements in the method of reporting, the Board will accept with pleasure any suggestions which they may make; and, in the meantime, it trusts that all will endeavour by carefully following out the present plan to secure the best results which at present are possible.

I have the honour to be,

Yours very truly,

DR. P. H. BRYCE, M. A.,
Secretary.

ARTICLE V.

EXPLANATION OF THE MAP ISSUED BY THE PROVINCIAL BOARD OF HEALTH, ILLUSTRATING THE WEEKLY PREVALENCE OF DISEASE THROUGHOUT THE PROVINCE.

(Vide Map.)

The information from which these reports are deduced is received from correspondents in various places in the districts into which the Province is divided.

The Province has been divided for purposes of comparison into ten districts, the comparisons being based upon differences in geological formation and meteorological conditions due to (a) difference in height above the sea level, (b) difference in prevailing winds, (c) difference in rain and snow-fall, (d) difference in forest areas. These divisions are due to the fact that relations more or less intimate are assumed to exist between the prevalence of certain diseases and the predominance of one or more of these conditions. The comparison of diseases in any district being dependent upon the number of cases reported by physicians as occurring in their own practice, it follows that the degree of correctness will be in proportion to the number and accuracy of reports received. It is felt, however, that the number of reporters from the various districts is large enough to make the reports sufficiently accurate for Provincial comparison.

To make these reports more complete, the meteorological condition of the various districts is also appended to the map, the Dominion Weather Service having kindly consented to supply the Board with weekly reports.

As will be seen, the average height above the sea-level of any district is deduced from the heights of the various localities of such district as are given on the map.

The names of the diseases which are given in the printed spaces are arranged in the order of prevalence, the one of which there is the greatest number of cases being placed first, the next greatest placed second, etc., etc.

Opposite each disease is placed its percentage value as compared with the total number of cases of all diseases reported from the district.

Explanations of diagrams:—In Diagram C, on the horizontal line opposite the number representing each district, will be found the various weather conditions in their respective vertical columns, as deduced from the reports supplied by the Toronto Observatory. Thus comparisons can readily be made.

In Diagram A, representing the prevalence of disease, are to be seen vertical columns with the left-hand vertical divided into ten parts, each of which is equivalent to ten per cent. This division is intended to represent the *area of prevalence* of any disease. Thus where any one of the diseases, prevalent in any one area, is found in all the others, it will be equal to one hundred per cent., and so on for the other numbers below *ten*.

Diagram B shows the *degree of prevalence* of diseases occurring throughout the various areas of the Province. The comparison is made by taking the total number of cases of any one disease and finding the percentage of it as compared with the total number of cases of all diseases recorded for the week.

The diseases are arranged in order of prevalence, those in any given space having a percentage equal to or higher than the figure placed opposite the space in the column to the right. Thus, as will be seen in the diagram, *Bronchitis* has a percentage greater than $12\frac{1}{2}$ per cent., while *Erysipelas* has a percentage less than $2\frac{1}{2}$ per cent.

The information supplied in Diagram B of earlier Bulletins being of great importance, as supplying data concerning the localized degree of prevalence of any disease, can be readily obtained by a study of the various districts in which any particular disease occurs.

N.B.—The copy of the map accompanying this report has the various districts represented by their numbers only; while in the copies of the map issued weekly the extent of the districts is made additionally evident by the use of different colours to represent the various areas.

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APPENDIX G.

ARTICLE I.

[It is not intended to correspond with Cap. VII., Part I.]

CATALOGUE OF LIBRARY BOOKS, EXCHANGES, ETC.

- An Act to amend the law relating to Public Health, 7th August, 1866.
 " " Public Health Act, 1848.
 " vesting powers in Privy Council for protection of the Public Health.
 Ann Arbor, Michigan, The Physician and Surgeon.
- Blyth, A. W., Foods: Composition and Analysis.
 Birmingham, Health Report of, for years 1881-'82.
 Bradford, Borough of, Report, 1880.
 Barking, Dr. Thorne's Report on Outbreaks of Scarlet Fever at Home for Girls,
 March 3rd, 1880.
 Baltimore, Maryland, Medical Journal.
 Battle Creek, Michigan, Good Health.
- Chicago, Chicago Medical Review.
 " The Western Medical Reporter.
 " Chicago Medical Journal and Examiner.
 " The National Scientific Journal.
- City Board of Health Reports—
 Boston City Board of Health Report for years 1881 and '82.
 Baltimore " " " " 1878, '79, '80, '81.
 Detroit " " " for year 1882.
 New York " " " " 1882.
 Portland " " " "
 Toledo " " " " 1881.
- Washington, Report of the Marine and Hospital Service of the United States.
 " Hygienic and Medical Reports by Medical Officers of the U. S. Navy.
- Cheltenham Health Report.
- Detroit, The Journal of Progressive Medicine.
 " The Therapeutic Gazette.
 " The Detroit Lancet.
 " " Clinic.
- Dansville, New York, The Laws of Life and Journal of Health.
 " " The Lecturer.
- Documents of State and City Boards of Health—
 Michigan State Board of Health Documents (vide Appendices, page 58, *et seq.*)
 New York " " " " " " " 33, "
 " City " " " " " " " 32, "
 Boston " " " " " " " 26, "
- Dublin Health Report, 1882.
 " Report on the State of the Public Health for April, 1882—July, September,
 and December, 1881.
 " Report on the State of the Public Health and Sanitary Work performed during
 1880.
- Derby, Borough of, Annual Report, 1880.
- Epidemics and Contagious Diseases, Papers concerning provisions regarding them.
 Evian Ses Eaux Minerales, 1881.

Fox, C. B., Sanitary Examination of Water, Air and Food.
 Fowler, R., M.D., Speech before the Metropolitan Asylums District Board.
 Fever, Enteric, Reports on the Outbreaks of.

Gloucester, Health Reports, 1879, '80, '81.
 Glasgow, Census, 1881—as a basis for the Statistics.
 General Order, Urban Sanitary Authorities.

Hygiene des Habitations, et des Villes, 1882.
 Healthy Homes, R. Sproule, M.D.
 Huddersfield, Borough of, Annual Report, 1880.

Journal of the Society of Arts, 1875.

Kensington Monthly Health Reports for 1881.

Louisville, Kentucky, The Louisville Medical News.
 Lewisburgh, Pennsylvania, Science and Health.
 London, England, The Scientific Roll.

“ City, Day Census Report of, 1881.

“ “ Report on some Chemical Analyses of the Water from the Surface Wells,
 by W. S. Saunders, M.D.

“ “ Report of the Commissioners of Sewers on the Results of the Electric
 Lighting in, 1881.

“ “ By-laws for Slaughter-Houses, 1877.

“ “ Regulations for Houses occupied by more than one family.

Locations and Administrations of Special and General Hospitals in which Contagious
 Diseases are Received, by Sir J. R. Cormack, M.D.

Lead Pipes, Action of Water upon, by W. S. Saunders, M.D.

Local Government Board, Annual Reports of—

Sixth, 1876–77.

Seventh, 1877–78.

Eighth, 1878–79.

Ninth, 1879–80.

Tenth, 1880–81.

Ninth, 1879–80 }

Tenth, 1880–81 }

Which is a Supplement.

Les Lois Sanitaires en Serbie.

Medical Inspector's Return, in 1 Volume.

Middlesex and Hertfordshire Seventh Annual Report, 1880.

Model By-laws for the use of Sanitary Authorities, from No. 1 to 14 inclusive.

Medical Inspector's Reports on General Sanitary Conditions of certain places.

Newcastle-upon-Tyne, Report of Health Sanitary Condition of, 1880.

National Board of Health Report, 1879.

New York, The Sanitary Engineer.

“ The Herald of Health.

“ Druggists' Circular and Chemical Gazette.

Paris, France, Journal D'Hygiène.

Philadelphia, The Medical Bulletin.

“ The College and Clinical Record.

“ The Medical News.

“ Medical Register.

Public Health Reports, new series, from No. 2 to 8 inclusive ; and also Volume 10, with
 Appendix 11.

Paddington Sanitary Report, for 1880.

Public Health, Arrangement of Clauses, 1875.

“ “ Reports, No. 1, 1873.

“ “ Act, 1875.

Police and Sanitary Regulations, Report from Select Committee on.

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- Port Sanitary Authorities' Regulations with respect to Medical Officers of Health—
General Order.
- Pauper Sickness and Death Returns, Memoranda and Tables.
- Playter, Work on Hygiene.
- Quatrième Congrès International d'Hygiène de Geneve, 1882.
- State Board of Health Reports—
- | | |
|--|---|
| Connecticut State Board of Health Report for year 1880. | |
| Illinois " " " " " | 1878. |
| Michigan " " " " | years 1873, '74, '75, '76, '78, '79, '80, '81, '82. |
- Michigan State Medical Society Transactions for years 1880 and '81.
- Maryland State Board of Health Report for year 1882.
- Massachusetts " " " "
 years 1872, '75, '79, '80, '81, and '82. |

New York, Manual for use of Local Boards of Health in State.

 " State Board of Health Report for years 1881, '82.

North Carolina " " " " "
 1879, '80. |

Rhode Island " " " "
 for year 1879. |

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year 1879–80.

St. Mary's Parish, in the County of Surrey, Twenty-fourth Annual Report of 1880.

Salford, Tenth and Twelfth (1880) Annual Health Reports of.

Statistical Abstracts for the Decennium, 1869–'78.

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of, 1880.

Stockholm Contribution à la Geographie Medicale, 1881.

Sutton-in-Ashfield, Urban Sanitary District, Dr. Parsons' Report on Outbreak of Diph-
theria, June, 1882.

Smallpox and Epidemics, Memorandum on the Duties of Sanitary Authorities.

Sanitary Record.

Toronto, The Canada Lancet.

 " Monthly Weather Review.

 " The Canadian Journal of Medical Science.

Washington, Monthly Weather Review.

 " National Board of Health Bulletin, 1879, '80, '81.

 " Walsh's Retrospect.

Westminster, England, The Vaccination Inquirer and Health Review.

Whitechapel, District Report on the Sanitary Condition of, 1881.

Water Analysis.

APPENDIX H.

ARTICLE I.

REPORT OF THE COMMITTEE OF THE WHOLE ON LEGISLATION.

To the Chairman and Members of the Provincial Board of Health of Ontario:

Your Committee on Legislation, having examined the various legal enactments relating to Public Health now in force in the Province of Ontario, would most respectfully recommend as follows:—

1. (1) That such legislation be enacted as shall secure the appointment by the Municipal Council of every city, town, incorporated village and township, of a Local Board of Health for such municipality; and, at the same time, shall provide that such Board of Health shall appoint a Health Officer, who shall be the executive officer of such Board, and who shall, whenever practicable, be a properly qualified medical man.

(2) That Health Officers, so appointed, shall be required to report annually, and at such other times as may be required, to the Provincial Board of Health of Ontario, regarding the prevalence of epidemics, the progress of sanitary work, and such other matters as may from time to time be deemed advisable in the interests of the public health.

(3) In the appointment of Health Officers, the same person may be appointed by the Boards of several adjoining municipalities—should it be necessary for the purpose of avoiding expense, or for other reasons.

2. That chapter 191 of the Revised Statutes of Ontario, entitled “An Act Respecting Vaccination” be applicable to towns, incorporated villages and townships, as well as to cities as at present. If this were done it would, undoubtedly, lead to a more general vaccination of the population of this Province, and consequently to a much greater freedom from outbreaks of Smallpox.

Your Committee would also recommend:—

3. The adoption of such legislation as would prohibit persons suffering from, or having very recently recovered from, any dangerous or infectious disease, such as Smallpox, Diphtheria, Scarlet and Typhus fevers, Measles, and Whooping-cough, from exposing themselves in any public conveyance, without having previously notified the owner or person in charge of such conveyance, of the fact of their having at the time, or having recently had, such disease.

4. That the owner or person in charge of any such conveyance, must not, after the entry of any infected person into his conveyance, allow any other person to enter it without having sufficiently disinfected it under the direction of the Local Board of Health or Health Officer.

5. That no person shall sell, transmit, or expose bedding, clothing or any articles likely to convey any such disease, without having first taken such proper precautions as may be necessary to remove all danger of communicating any such disease to others.

6. That no person shall let or hire any house or room, in which any of the aforementioned diseases, or Typhoid fever, have recently existed, without having caused such house and premises to be disinfected to the satisfaction of the Local Health Authorities.

7. That the penalty for the violation of the last clause, be not less than five, nor more than fifty dollars.

8. That the following be added to clause twelve of the Public Health Act of 1882, viz.: “Every municipality may provide a portable or other furnace for the disinfection of clothing and other articles, as well as such disinfectants or disinfecting appliances, as it may deem necessary; and may charge persons who are able to pay the same, such fees as may be found necessary to defray the expense for the use thereof.”

9. That Section ten of the Public Health Act of 1882 be repealed, and the following substituted therefor: “Whenever this Province, or any part thereof, or place therein, is

threatened with any formidable epidemic, endemic, or contagious disease, the said Board shall have and possess all the powers, rights and authorities heretofore conferred upon, or vested in, the Central Board of Health, by the said one hundred and ninetieth chapter of the Revised Statutes of Ontario; and the said first named Board shall in such case possess, and may exercise, in its own name, all or any of such powers, rights and authorities, in addition to any powers by this Act conferred; and it shall not be necessary that the said district shall be declared by proclamation of the Lieutenant-Governor in Council, to be subject to the provisions of the said Act."

10. Your Committee would also recommend the adoption of the following clause, in order to make provision for certain cases to which there seems at present no legislation applicable: "When information has been given by the Local Board of Health of any municipality, that any remediable unsanitary condition or nuisance exists within that municipality and in one or more adjacent or contiguous municipalities; and that the said Local Board desires to take effective action for the removal of such unsanitary condition or nuisance; and if, on examination by a Commission of the Provincial Board of Health, it be found that such unsanitary condition or nuisance is dangerous to the public health, it shall be incumbent upon such adjacent municipality or municipalities, to take common action with the first mentioned municipality in removing such unsanitary condition or nuisance; and it, or they, shall bear such proportion of the expense for such removal, as may be mutually agreed upon, or determined by arbitration."

Your Committee would further recommend:—

11. That Section two of the Public Health Act of 1882 be amended as follows:

(1) "The Chairman of the Board shall be appointed by the Lieutenant-Governor in Council, and shall be paid such annual salary as may from time to time be determined. The services of the other members, except the Secretary, shall be honorary, unless when engaged in attendance upon meetings of the Board, or any of the committees thereof, when they shall be paid such per diem allowance as may from time to time be determined, together with their travelling and other necessary expenses, when so occupied."

(2) That Section seven of the said Health Act of 1882, be amended as follows:

"The Lieutenant-Governor in Council may appoint a competent and suitable person as Secretary of the Board, who shall hold office during pleasure, who shall be the chief Health Officer of the Province, and who shall be paid such annual salary as may from time to time be determined."

12. Your Committee would further recommend, that such clauses be inserted in the Municipal Act (chapter 154), or the Public Health Act (chapter 190), Revised Statutes, as shall give to Local Boards of Health the power of ordering an examination to be made, by a competent person, of the water or waters used by any of the inhabitants of their respective municipalities, when deemed necessary by such Local Board or Boards of Health, and of regulating the construction and cleansing of wells, and for closing or stopping wells, or other sources of water supply, the waters of which shall be found unfit for use.

13. Your Committee would also recommend, that the Registration Act be amended by the following clause:

"That no public carrier or other person, shall remove the dead body of any person out of any municipality, without having first obtained a certificate from the Division Registrar of said municipality, that the particulars relating to the death of such person, have been duly registered with him under the provision of said Act. This certificate shall be known as a 'Transit burial permit.'"

All of which is respectfully submitted.

FRANCIS RAE,
Chairman.

PART III.

ARTICLE I.

ADDRESS OF THE CHAIRMAN AT THE INAUGURAL MEETING OF THE BOARD.

To the Members of the Provincial Board of Health :—

GENTLEMEN,—In company with others, most of us have met before to discuss subjects akin to those which are now to engage our attention, but on this occasion it must be an additional gratification to know that we are called together by direction of his Honour the Lieutenant-Governor, in accordance with a recent enactment of the Legislature of this Province. Had we lived in olden times, or rather had we retained the customs of olden times, we would mark with a red letter the day on which we are able to congratulate the people of this country that they, through their representatives, have given practical expression to the view that has long existed with many, that it is a duty which the state owes to the people, which the people owe to themselves, to protect themselves against the inroads, the onsets of disease, against “the pestilence that walketh in darkness,” no less than against “the destruction that wasteth at noon-day;” against the secret emissaries of disease that are constantly lurking about our homes, no less than against the more open array of “formidable epidemic” that calls forth the proclamation of the Lieutenant-Governor in Council. They are to be congratulated on the recognition in this Act of the fact that, whilst the means adopted to repair the damages of disease in individuals may be left to themselves, it is by united and concerted action, earnestly and actively supplemented and supported by individual effort, that its onsets can be best anticipated, prevented and arrested. Their having considered it wise and beneficial to have a body of men constantly on the watch, constantly investigating the preventable causes of disease and accident, ever ready to give advice and direct local and individual efforts in that direction, is the cause of our being assembled to-day. I feel that I am expressing not only your sentiments and my own when I dwell for a short time on the importance of the step that has been taken in establishing a Provincial Board of Health, on the extent and importance of the work that lies before it, and on the grand results that may be expected—nay, that with due care and diligence must and will follow: I know that I am expressing also the thoughts of many of our fellow-countrymen, both in the medical profession and outside of it, who for years have been labouring to perfect and diffuse knowledge, and establish better principles and practice, for the prevention of disease and the promotion of health in its highest degree of perfection.

Some who are friends of ours and friends of the scheme have had gloomy forebodings as to the difficulties that lie before us, arising, they say, mainly from the parsimonious spirit of municipalities, the dislike to spend money in anything that will not at once show itself in a tangible form to the populace. If so, it must be our constant endeavour to show to the people such facts and figures as will convince them of the speedy and bountiful return they will receive for the small outlays they may have to incur in following our advice. The field before us is indeed a large one, and one in which there will be many hard spots to reclaim; but shall we, who have been labouring in it in the cold grey dawn, be discouraged now, when the sun of prosperity has begun to shine upon us in the shape of a legislative recognition of the importance of the work? Nay, rather let us set to work with redoubled energy, let us call to our aid other labourers and co-operate with them, and let us by constant application increase the number of them until these matters become of commonly recognized importance among the people.

We shall receive cheering words and friendly assistance, as indeed we have already,

from those who are working in neighbouring fields; and we in return will cheer them on and help them in their work.

It might not be out of place for me to refer to numerous instances of what has been done by persistent and systematic sanitary reforms, such as those we desire to see introduced, or systematized and maintained in this country; but as you are doubtless familiar with statistics of various cities, towns, and other communities where the death-rate has been largely reduced by such means, and with computations showing the vast amount of money saved thereby, to say nothing of the amounts of misery, suffering and sorrow that have been obviated, and the amount of increased happiness that has resulted, I will confine myself to one illustration of these truths that has lately fallen under my notice in a paper by Hon. Erastus Brooks, entitled "What the State Owes the People—Public Health is Public Wealth," read before the American Public Health Association, and published in the report of the North Carolina Board of Health. The writer of the address refers to the statement of Mr. Edwin Chadwick before the British Scientific Association, that both the sick-rate and death-rate of Great Britain had been reduced one-third by the practice of sanitary laws, that in many parts it has been reduced much lower, and that it is his belief from what has been demonstrated that with a still more perfect system it may be reduced by two-thirds of its former rate.

Now, what does this mean for Ontario? Let us take merely what has been done in the record to which I have referred, not what may be. And what has been done may be done again. It means, then a saving of more than six thousand lives annually of the people amongst whom we move, and with whom we daily associate in friendly and business intercourse. Is it or is it not worth the effort? Who would, in the face of this estimate, grumble at the pecuniary outlay, even if this did not repay itself in money, as it will a thousandfold. But some may say, "this is not Great Britain," meaning thereby that the crowding, and poverty, and ignorance there left more saving to be done. But let us not arrogate too much to ourselves. I doubt not we can, each one of us, lay our fingers upon numbers of cases, can call by name the persons, where lives have been, to use the mildest term, needlessly sacrificed by violations of laws for the prevention of sickness and death, violations on the part of others, as well as on their own. Nor have people in sparsely settled districts much to congratulate themselves upon. This might be otherwise did they not allow their advantages in point of space to be counterbalanced by want of appreciation of other hygienic laws.

But our loss is not to be measured by the mortality list alone, frightful as it is to contemplate. We must remember that for every death there are many sick who do not die, and that their idleness while sick is a heavy loss; but let us hear the evidence the Hon. Mr. Brooks has to bring forward in connection with this view of the matter:—"If to this result the money value of life is counted, the five or six thousand lives yearly saved will run into some millions of dollars. In great Britain they place this kind of value upon human existence, just as we say in the United States that the cash value of every able-bodied immigrant from the Old World is one thousand dollars. There Dr. Farr—perhaps the highest authority in the Old World—placed, in his reports as the registrar-general of the Government, the money value of each man, woman, and child in the United Kingdom at seven hundred and ninety-five dollars. The neglected preventable deaths in England and Wales during the school period, apart from infant mortality, makes a loss to the State of ninety-five million dollars. The British life insurance companies and friendly societies also give the money value of work lost by sickness. For every death there were, as proved on careful investigations by the Government, two persons always sick and disabled, thus making a loss for each death of seven hundred and thirty days in each year. This result is reached by placing the minimum of the entire population at the sum of seven hundred and ninety-five dollars here named, and to these figures are added fifty thousand lives lost annually in the school age in England and Wales which might be saved."

A similar calculation applied to Ontario will give us a saving of nine million, five hundred and forty thousand dollars, which, on the ground that what has been done can be done, will be effected if our municipalities and our people co-operate heartily and

generously in the work. And this is exclusive of all allowance for the attendance of those who care for the sick and other similar expenses, and all allowance for the greater value of labour in this country.

In order to understand how the obstacles to sanitary reform and the apathy with regard to united and systematic effort may be best removed, it may be well to look into the reasons why this apathy has so long existed. In the first place, we know that the people, as a rule, become so accustomed to what is daily and yearly occurring around them that they do not so readily appreciate this waste of life as they would if it were aggregated into some sudden appalling calamity, such as the Victoria disaster of London, or divided amongst a number of such catastrophes. And indeed all, or even a respectable minority, do not know the facts of this unnecessary loss of life.

Secondly, too much has been left to "common sense," forgetting that common sense is not good sense, and that what is everybody's business is generally nobody's business, and that when a private individual makes it his business, he is often made to feel that some think it is not.

A third cause for this sluggishness I may be allowed to illustrate by saying that he who rushes into the water and rescues the mangled form of a child who has fallen over the precipitous bank of the river, is to the world a greater hero than he would have been had he devoted ten times as much time and trouble to erecting a fence along the treacherous roadway. But let each and every of us say whether in the event of life being lost, or damage to health and happiness incurred, by our neglecting to perform duties that have been plainly pointed out to us, or which by a gross want of thought we have failed to see in time, let us, I say, consider whether the blame that attaches to us be not as great as the credit which attaches to him. Let us also consider whether the merit that attaches to our hero can in no way be approached by the more steady patient heroism of him who incurs personal risk and devotes labour and time and money with the same object, though at an earlier period, of saving life and preventing misery.

Fourthly, there is the short-sighted money obstacle I have already referred to, and indirectly combatted at sufficient length.

The means by which we are to enlist the sympathies and co-operation of our fellow-countrymen, the people at large, is one of the subjects to which I hope you will give your attention at this first meeting of the Board. We shall find many who have already been working in these matters, and I trust that we may confidently count on their joining hands with us. Amongst such will be found a large number of the members of the medical profession, who have necessarily had their attention largely directed to these subjects in connection with the causation, prevention, and restriction of disease. Outside the medical profession also are many who have devoted a large amount of study and practice to those branches of the work which do not require medical knowledge, not to speak of those who, in connection with the subjects of biology, chemistry, and other allied studies, have thrown so much light on sanitary science. Besides, there are certain principles so long and well established that they are now parts of our popular lore: for example, most people know theoretically that air that has been once breathed is not fit to be breathed over again, and that sewer gas does not improve it; some act as if they knew it, and there is nothing to prevent any person versed in generally understood pneumatic laws and of an ingenious turn of mind from putting into practice, and pointing out to others, contrivances for exchanging impure air for pure, and cold for hot or hot for cold, as the season may require. Most people know theoretically that to drink water contaminated with the albuminoid ammonia of sewage is not healthy, even though it be as clear as "the sparkling fount of Hippocrene," or a solution of arsenic. If you now invite them to consider practically whether the sandy or gravelly soil of their back yards permits an interchange between the contents of their well and cesspool, it will not need the technical knowledge of a physician to put the question or give the answer. Again, some of the avenues by which contagious diseases are spread, and the means of closing them, can be readily appreciated by those who are not practitioners of medicine. So, too, with regard to exercise and rest, sunlight, clothing, and many of the principles relating to food.

It will be obvious that by obtaining the co-operation of prominent laymen we shall

the more quickly get the people at large to appreciate the fact that this is a thing "for the people and with the people," and no mere doctors' question; the more rapid and complete and thorough will be the introduction and success of hygienic measures among them. Besides, the more people's minds become occupied in a good sensible way with preventive medicine the less harmful quackery shall we have, and the less will they suffer (as the Mayor of Greenville facetiously remarked at the recent convention at that place under the auspices of the Michigan Board of Health), "The less will they suffer from Scarlet Fever, Cramps, Winslow's Soothing Syrup, Typhoid Fever, Diarrhœa, and Holman's Liver Pad."

The Legislature, in framing the recent Act, has already enunciated the desirability of enlisting the co-operation of laymen by making a provision for their being on the Board.

We must also seek to reach the people through the heads of municipalities, aldermen, health officers, through the press (we must take care to ventilate the printing offices), that powerful lever of modern times; through those who are engaged in Christian and philanthropic work; by holding meetings amongst them and giving them an opportunity of taking part in the discussion of such topics as they understand, of becoming acquainted with the conditions and needs of various localities, and of diffusing in a practical and interesting method such information as we can by inviting various gentlemen to contribute, and by contributing ourselves.

We must bring before them prominently and strikingly, but without undue colour or exaggeration—unfortunately we do not need that—statistics as to the waste of life and happiness such as I have already referred to. Alas! from many an empty cot the "poor dumb mouths" will speak more eloquently than we can on this point, and many a sickly form will add its passive and patient eloquence too, and display it silently and painfully before those more immediately interested. To those who have as yet had no such experience, and to hard-souled corporations (should any such exist), we must display such facts as these: that in Toronto and Hamilton alone in the last two years sixty-nine people died, most of them of course unnecessarily, from one preventable disease, Scarlet Fever. Would not those who loved them while in life have alone and unaided contributed enough to pay two Health Officers, if they could thereby—as in most cases they could—have saved those so dear to them, and if, too, the corporations of those places had been so parsimonious as to allow them? But I would rather believe that such action on the part of corporations arises from want of thought and knowledge, not from want of heart.

What a host again would be the four hundred and nine, who, by our last report, died in one year from this disease in our Province.

But, gentlemen, I must not further anticipate your labours. I have thus thrown together a few thoughts upon the position and prospects of the work of this Board, without attempting to exhaust the subject. Had I made any such effort, I would have been attempting to write a book on Public Health, which it was not my intention to do. This, I hope, we shall gradually see compiled, page after page, in your deliberations and your contributions, both in theory and practice, to the advancement of the public health. And I cherish the fond anticipation that those who, in after years, may read it as imprinted upon the sanitary condition of this fair Province, will be able to say that we have left this at least a little better than we found it.

ARTICLE II.

REPORT OF THE SANITARY CONVENTION HELD IN ST. THOMAS, ON
SEPTEMBER 19TH AND 20TH, 1882.

BY THE SECRETARY.

The idea of holding a Sanitary Convention for the dissemination of sanitary information having impressed itself favourably upon the delegates of this Board to the Greenville Convention, held under the auspices of the Michigan State Board of Health, in April last, the matter was introduced by them to the notice of the Board, and on motion it was decided, if possible, to make arrangements for one to be held at some convenient date in September. This appeared all the more easy, since a desire had been expressed by the Mayor, Dr. VanBuskirk, and several other medical men of St. Thomas, that this Board should hold such a Convention in that city. Wishing to fall in with this desire the Secretary was instructed to communicate the resolution of the Board to Dr. VanBuskirk, and secure the active coöperation of the local members of the profession and other influential citizens. Arrangements having been completed as to the time and place of holding the Convention, a number of local gentlemen undertook to read papers on sanitary subjects, and these were supplemented with papers by several members of the Provincial Board, and others. The objects aimed at, and which I am happy to say were most successfully achieved, were to have papers prepared on various important subjects, and read, after which all present at the various sessions of the Convention were invited to express their views on the subject matter of the papers. The papers, all very valuable in themselves, were made much more interesting and instructive by the discussions which followed. Practical opinions were expressed of the difficulties arising concerning many proposed remedies for existing sanitary evils, while the advantages to be gained by the adoption of improved sanitary methods received able exposition. The benefits accruing from arousing public interest by this and other means, cannot be over estimated. Not until a much more general and active interest is aroused, and a much wider dissemination of the knowledge of sanitary laws, than at present exists, is obtained, can we expect the public of various communities to agitate for local measures tending to decrease the dangers to the public health on every hand so imminent.

Arrangements having been made with the various railways for reduced fares, persons from various quarters, who were interested in such matters, found their way thither. Owing to the fact, however, of the Convention being held during the month of the various Agricultural and Arts exhibitions, a comparatively small number of persons from a distance attended; but as the purpose of such Conventions become better known, the general interest will doubtless increase.

The following gentlemen constituted the local and associate committees :

LOCAL COMMITTEE OF ARRANGEMENTS.

Dr. W. C. VanBuskirk, Mayor, *Chairman* ; Dr. R. Kains, *Secretary* ; D. J. Hughes, Esq., County Judge ; A. McLaughlin, Esq., Registrar ; Rev. Prof. Austin, Alma College ; Rev. M. Fraser ; J. Bell, Esq., C.E. ; Dr. J. H. Wilson, M.P. ; Dr. J. J. Cascaden, M.P.P.

ASSOCIATE COMMITTEE.

W. Oldright, M.A., M.D., *Chairman* Prov. Board of Health ; Dr. P. H. Bryce, M.A., *Secretary* Prov. Board of Health ; Dr. J. J. Cassidy, Member Prov. Board of Health.

The following gentlemen, amongst others, were present :—Dr. Yeomans, a member of the Board ; Dr. Cascaden, M.P.P., Iona ; Judge Hughes, St. Thomas ; Dr. Ellis, Toronto School of Science and Public Analyst ; Rev. Prof. Austin, Alma College ; Dr. Kains, secretary of the local committee ; Dr. Wilson, Dr. R. W. B. Smith, Mr. Coyne, Dr. McLarty, St. Thomas ; Mr. Coatsworth, City Commissioner, Toronto ; representatives

of the *Toronto Globe and Mail*, the *London Advertiser* and the local newspapers, and the members of the various committees.

By arrangement of the Local Committee the meeting was held in the Court House, and the first session in due course, began with the Mayor, Dr. W. C. VanBuskirk, in the chair.

The following is a copy of the programme, which was very thoroughly carried out, one or two papers, however, from various circumstances, being omitted :

ST. THOMAS SANITARY CONVENTION, TUESDAY AND WEDNESDAY, 19TH AND 20TH SEPTEMBER.

FIRST SESSION, Tuesday, 2.30-5.30 p.m.

1. Opening Exercises.
2. Mayor's Address of Welcome, Dr. W. C. VanBuskirk, Mayor.
3. Advantages of Sanitary Education, Dr. J. Cascaden, M.P.P., Iona.
4. Objects and Aims of Sanitary Conventions, Dr. W. Oldright, Toronto, Chairman Provincial Board of Health.

SECOND SESSION, 7.30-10 p.m.

1. Opening Exercises.
2. Adulteration of Foods, Judge Hughes, St. Thomas.
3. Impurities of Water, Dr. W. H. Ellis, M.A., School of Practical Science, Professor of Chemistry and Government Analyst.
4. The Public Schools and the Public Health, Rev. Prof. Austin, Alma College, St. Thomas.
5. Contagion, Dr. R. W. B. Smith, Sparta.

THIRD SESSION, 10-12.30 a.m.

1. Opening Exercises.
2. Prevention of Diphtheria and Scarlet Fever, Dr. R. Kains, St. Thomas.
3. Impurities of Water, Dr. J. L. Bray, Chatham, President of the College of Physicians and Surgeons of Ontario.
4. Restriction of Smallpox, Dr. J. Coventry, Windsor.
5. Sewerage as a Sanitary Measure, Dr. W. C. Van Buskirk, St. Thomas.

FOURTH SESSION, 7.30-10 p.m.

1. Opening Exercises.
2. Reports of the various Committees.
3. Combined Warming and Ventilation of Dwellings, Dr. J. J. Cassidy, Toronto, Member of the Provincial Board of Health.
4. Ventilation of School Rooms, J. Butler, Esq., St. Thomas, Superintendent of Schools.
5. Closing Exercises.

A discussion will take place after the reading of each paper, in which all attending the Convention, and who feel interested in the subject, will, it is hoped, take part.

N.B.—Space will be set apart for the exhibition of Sanitary Apparatus, etc.

DR. P. H. BRYCE, M.A.

Secretary.

After devotional exercises had been conducted by the Rev. M. Fraser, the Mayor delivered an address, heartily welcoming those in attendance from a distance in the name of the citizens of St. Thomas, and expressed in their name, the appreciation felt in the fact of St. Thomas having been selected as the place for holding the first Sanitary Convention, under the auspices of the Provincial Board of Health. He recognized the wisdom of the Legislature in creating the Provincial Board of Health, and dwelt upon the importance of the work undertaken by it.

After the Mayor's Address of Welcome, the regular work of the Convention was pro-

ceeded with. The Secretary of the Convention, Dr. Bryce, read a letter from Dr. Bray, President of the Ontario College of Physicians and Surgeons, regretting his absence, enforced through the death of his brother at Wingham. He had also been notified that the following were unavoidably absent:—Dr. Harris, Secretary of the State Board of Health, New York; Dr. Baker, Secretary of the State Board, Michigan; Dr. White, Chief Health Officer, Detroit; Dr. Edwards, London.

Dr. Oldright then delivered the following introductory address on

“THE AIMS AND OBJECTS OF SANITARY CONVENTIONS.”

MR. CHAIRMAN, LADIES AND GENTLEMEN,—Having been asked by the Committee on Arrangements to make a few introductory remarks explaining the objects of this and similar Conventions, I will endeavour briefly to do so.

The “Advantages of Sanitary Education” will be fully treated in a paper to be read by my friend Dr. Cascaden, and it will be unnecessary for me to dilate or insist at length on these advantages, or to multiply illustrations of them. The importance of health is universally admitted. Although in practice it is often denied, still our literature teems with expressions indicative of the feeling that health is the greatest and most important of earthly blessings, and our every-day greetings, our “How do you do?” and “How are you?” (as has been remarked by one of our authors) express the same recognition of the paramount importance of health. This universal admission must lead to another, namely, that it is very important that we should know how to preserve our health. This, too, has been generally admitted, but unfortunately people have also too generally supposed that it only required a little common sense to keep matters right in this respect—as right as they could be kept by ordinary agencies—and that there was nothing for it but to let the human machine run along, and when by some mysterious and extraordinary cause it should get out of order, send for the doctor.

But there has been a great change of opinion in regard to these matters within the last ten or fifteen years. Scientific men have been showing in innumerable ways that in our everyday surroundings, and our management of them, there is much more “than we in our philosophy dreamed.” The next step was, and is, to make the discoveries in sanitary science of practical value; and to be so it is evident that they must become the property of the people at large; that they must know of them, and to a certain extent understand them, in order to put them in operation.

One thing that has somewhat hindered the diffusion of sanitary knowledge, and the making it of practical service, has been the common idea that this was a matter for the doctors. It is quite natural that people should feel that medical men, engaged as they are in searching out and combatting the causes of diseases, should, *ceteris paribus*, be the persons most competent to advise regarding the conditions best adapted to prevent their advent. But on consideration it will be readily admitted that in working out details there are men engaged in many other branches of scientific and professional work whose thought and experience will be of great value in advancing the cause and work of sanitary science, men versed in the laws which govern the movements of air and water (in pneumatics, hydrostatics and hydraulics), in the laws of chemistry and mechanics, and in the laws which govern the actions of men: chemists, mechanics, lawyers, legislators, civil engineers, teachers in matters secular and spiritual, these and others have their special parts to perform in this great work.

I have now hinted at two great ends which will at one and the same time be served by these Sanitary Conventions. They give to the co-workers of all classes and professions opportunities of meeting and of putting together their various contributions to the subject under discussion, whilst at the same time an audience is there obtaining all this information in the most pleasant and least laborious manner, and ready to carry it away and impart it to others. Let us take for example one of the subjects on our programme for this evening. We find there a paper on the “Adulteration of Foods.” Judge Hughes will doubtless tell us some things from his own observation and as the result of his literary researches which will surprise us. Then a Government analyst will have an opportunity of giving us his experience, and making us feel a little more comfortable,

showing us how we may satisfy ourselves about this or that article. Our merchants can then explain their part, or the parts of their predecessors; and our physicians can make us a little more comfortable or a little more uncomfortable, as the case may be, by telling us the effects of the adulterations and giving us other hints. We can then invoke our lawyers and fall back again on our judges and our legislators, and ask them to protect us against the wiles and machinations of sordid men. Were I to anticipate in an imaginary way the discussions which will take place on other papers, I might bring in our engineers, our builders, our teachers, our fathers and mothers; but I find I must stop.

In that sanitary education, the advantages of which are detailed in another paper already referred to, these Conventions are calculated to take a prominent part. They will teach the adult population of all classes in the way that at present seems the most practical and the most pleasant way. They afford an opportunity of asking and answering questions that cannot be so well obtained in any other manner, and also of following out what in the schools would be called object teaching. They seem, indeed, to be the complement of that education of the rising generation to which Dr. Carpenter refers in a letter we shall hear read.

A third end that will be attained in these Conventions is the opportunity it gives of obtaining a popular expression of opinion, after fully considering the arguments advanced, regarding any matter in which an expression of opinion will be necessary or helpful in obtaining legislation,—parliamentary, municipal, or otherwise,—or in supporting the action of the authorities. They are calculated to draw forth many suggestions which may prove of great practical value, and which can be fully considered and discussed either in the meetings of the Convention or after having been previously relegated to some one of the committees that may be appointed.

Another feature in them is the exhibition of apparatus and appliances that may be of value in the preservation of health and improvement of our sanitary surroundings. To examine and report upon these will be the duty of one of the committees to be formed.

Having now roughly indicated some of the aims and objects of this Convention, I know I will be speaking the desire of the Committee of Arrangements if I ask the members of the Convention, through you, our Chairman, to join freely in the discussions and to help one another by their questions and suggestions; and it will be borne in mind that all who attend the meetings of the Convention are members of it.

Judge Hughes, of St. Thomas, next delivered the following address on the

“ADULTERATION OF FOOD.”

MR. CHAIRMAN, LADIES AND GENTLEMEN,—Your invitation for me to take part in this Convention was received at the time rather as a neat compliment—flowing out of our long friendship and personal good will towards each other—than that I should regard it seriously and prepare a paper on any subject within the purview of the objects sought after. Social Science and Sanitary Reform do not belong to any one profession and may be participated in by many, because gentlemen of leisure and culture outside of what are termed the “learned professions,” adopt subjects of study that with other persons are considered specialities. I am not one of those who are favoured with leisure or possessed of the necessary culture to do more than give my own crude ideas on the subject I have chosen, and prepare a brief analysis of what I have read and observed on the subject.

We find these specialities frequently treated by laymen with ability, and I only regret that the object of writing a paper on the Adulteration of Food has not fallen into better hands.

I have been pressed into the service on this occasion more because it is desirable to give the matter a commencement than because I have an aptitude to deal with it or can say anything that is new or that may be interesting to learned men now before me.

What I have set down has been compiled more with a view to prove the necessity

for measures being adopted effectually to suppress the Adulteration of Food than that I have anything original to lay before you.

That there has been legislation on this subject—connected with the manufacture of various articles of food, drink and medicine, for many years, is known to all—and the good which has been effected by it is matter of history and experience.

We take up the articles of milk, coffee, tea, bread, oatmeal, beer, wine, whiskey, butter, and we know by everyday experience that most articles which enter into daily use and consumption, are for the most part *adulterated*.

I may say in this matter, that I am a *Reformer*! I may be so in other things when brought to the test; but in the matter of adulteration of anything—against shams and quacks and pretenders—one's nature revolts. We get aroused to righteous indignation and we feel inclined to do battle in order to put down that which is not only injurious in a sanitary point of view, but which has an immoral tendency upon our community, especially upon the youth.

What could have a worse tendency upon the mind of an apprentice to the business of a grocer than for his master, after closing his shop for the night, before calling his household together for family worship, to just peep into the shop and make a few inquiries, "Charley!" "Yes, sir!" "Have you put up the shutters safely?" "Yes, sir!" "Have you bolted the back door?" "Yes, sir." "Have you fastened the cellar door?" "Yes, sir." "Have you watered the molasses?" "Yes, sir." "Have you sanded the sugar?" "Yes, sir." "Have you done the other things?" "Yes, sir." "Well, then, now come into prayers!" This religious cormorant is careful to bolt and bar against thieves outside, never caring or thinking that by his course of training he is schooling a thief inside.

The Government of this country has set apart \$10,000 for the promotion of efforts to stop this plague of adulteration of food and other things, a trifling sum considering the millions that manufacturers and dishonest tradesmen make from the nefarious practice.

There are men holding prominent positions in society, and some leaders in our churches, who, in this matter, make money directly and indirectly, and would oppose active measures looking to its suppression—and who, in the matter of dishonesty and immorality, do not stand one whit behind most of those who occupy cells in the Central Prison—they make merchandise of a fraud and a deceit. What is this but obtaining money by false pretenses?

This traffic includes merchants, tradesmen and artificers. They not only practise deceit and adulteration, but they teach it to their employes; and this tolerated dishonesty, these tricks of trade, are not one whit behind the crime of the banker's clerk who forges a cheque, or the tradesman's or artificer's apprentice who robs a till, or a journeyman who steals money. He is *school*ed by his employer or master. What surprise is it that he should follow in the line of his master's dishonesty? A negro slave who robbed his master's henroost, thought it no harm to steal the chickens that were fed by the corn raised by his enforced labour. He argued that it was no harm anyway, to steal from a master who was so dishonest as to steal a human being and make him work as a slave. I argue that you have only to let a boy witness and become indoctrinated in the mysteries of adulterating food, in order to make him an accomplished rogue.

When we find milk watered and drugged, oatmeal ground up with shorts, sugar glucosed, coffee made out of clay or peas or chicory, tea poisoned, a loaf of bread made under weight, calico sized and weighted with plaster, and almost everything turned into a cheat and a fraud, we may be prepared for a large number of matriculants for the penitentiaries.

The legislation on this subject belongs to the Parliament of the Dominion as affecting trade and commerce—subjects with which the Legislatures of the Provinces cannot deal.

The only Act of the Parliament we find on the Statute Book goes for very little, and has been in my experience inoperative. I have not known in all the eight years of its existence a single prosecution for a breach of its provisions. No doubt the fear of offending and the dread of the political influence of so large a class of offenders as are engaged in this dishonest, nefarious traffic, may account for the Act remaining so long

a dead letter. There have been measures taken by some of the municipalities on this subject, more with a view of enquiring and reporting, than of putting a stop to the practice.

The Governor is authorized in every Inland Revenue Division to appoint one or more persons who possess competent medical, chemical and microscopical knowledge as analysts of food, drink and drugs purchased or offered for sale within the Division, and the Government may cause proper remuneration to be paid to these analysts.

The Officers of Inland Revenue, the Inspectors of Weights and Measures and Inspectors of Staple Commodities, *when they are required to do so* by a proper Government Regulation made in that behalf, procure and submit samples of food or drink or drugs, suspected to be adulterated, to be analyzed by the Analysts appointed under the Act, and upon receiving a certificate that such article is adulterated, must seize the articles from which the sample was taken, and every such seizure shall be a seizure under the Revenue Act and treated as such.

(Certain sections of the Dominion Statutes of 1874 were here read.)

This legislation was simply copying some of the now obsolete Acts of the Imperial Parliament, instead of taking up some of the more recent, better considered and matured and effective legislation of the present period.

I have not thought it fit to go more into detail on this measure of legislation, but there it stands, as I said before, a dead letter on the Statute Book in so far as my experience in the matter goes. Whatever force it may have in other cities, I know it has no force here.

In Great Britain—where a tradesman's character for honesty and fair dealing is of value to a respectable man; whose character for honesty is in fact part and parcel of his capital and of his stock in trade—public sentiment has a power of *insistence* on this subject which on this continent seems to be unknown.

The *Lancet* in the year 1851 published articles on adulteration and produced a Parliamentary enquiry which caused the Adulteration of Food Act of 1860 to be passed, but that Act, like our own, became effete.

In the years 1869 and 1871 fresh legislation was attempted. In 1872 another Act was passed compelling the local authorities to appoint Analysts with competent medical, chemical and microscopical skill, to examine and report upon all articles of adulteration, and to appoint Officers and Inspectors to purchase articles of food, drink and drugs, within their respective districts and take them to the analyst for examination. Other purchasers of such articles are permitted to have suspected articles analyzed, and on receiving a certificate from the Analyst that the article is adulterated the Inspector is bound to take the necessary legal proceedings for the purpose of bringing the offender to justice.

The penalties provided are heavy, and the ultimate punishment is quite exemplary, for the convicting justice may, in the case of the selling of adulterated food with a guilty knowledge, order that the offender's name be published in a newspaper or in any manner he may think fit at the expense of the offender.

Our own and the Mother Country are not the only nations which have dealt with this subject. Prussia has dealt with it as part of her criminal law, and makes the selling of adulterated or spoiled goods a misdemeanour punishable by a penalty up to fifty dollars or imprisonment for six weeks with confiscation of goods; and it is not necessary to prove a guilty knowledge in the seller.

In the Code Napoleon the same subject is dealt with.

In Holland the Dutch law is very much the same and prescribes a punishment of from six days up to two years imprisonment and a fine of from sixteen to six hundred francs. The adulteration of bread with copperas or sulphate of zinc is dealt with by imprisonment of from two to five years, and a fine of from 200 to 500 florins.

In Paris this crime is made the subject of investigation by a Council of Health and properly punished.

In the Food Journal for 1870 and 1871, we find the results published of investigations set on foot through the various British legations and consulates, by means of

circulars of the late Lord Clarendon and Earl Granville, so that much public attention has been awakened to the necessity for putting a stop to the system.

Milk, which has become so much an adjuvant of good nursing, especially of the sick as well as an article of food for both old and young, is shamefully treated so as to increase its bulk by what is technically called *Simpson*. This is made obvious by its appearance, its specific gravity, the quantity of cream which rises, or rather which does *not* rise, to its surface and by its chemical qualities.

Coffee, as far back as 1725, and perhaps earlier, was made the subject of adulteration. In that year an Act was passed by the Imperial Parliament (2 Geo. I. c. 30) which made it penal to so treat it. In 1803 again fresh and more decided measures were passed to prevent it.

Tea has been so much adulterated that those who deal in it can afford to sell it to you and pay you back a large premium from their profits in the form of a book suited for your library! You get so much *book* and so little *tea* that it would be safer for you to buy a book and do without the tea and drink warm water.

The extensively advertised Li-Quor Tea Company deal in this way, and their advertisements, like those of St. Jacobs oil, meet your eye everywhere you turn. Upon prudent minds the impression created is that so much money spent in advertising must come out of a very profitable but a very deleterious traffic. The time was when tea imported into this country was a monopoly of the East India Company, and when to bring from the United States was to risk its being seized as contraband; but the article, that was subjected to so great a roundabout in reaching the consumer and which was beset with so many difficulties in smuggling it, was generally of the best quality, for poor tea was not worth the trouble and risk and expense connected with its long journey from India; but now-a-days, tea is made in Montreal and New York and other large sea-ports and commercial centres; the adulteration is carried on on old leaves or inferior materials after they are imported, and large floors and treating and drying houses are prepared for a traffic that is not only illegal but most nefarious and injurious in a sanitary point of view. The men who engage in manipulating this kind of adulteration are obliged to keep close nets over their nostrils and mouths to prevent the inhalation of poisonous dust which arises from the chemicals used in colouring and facing the leaves used.

Much legislation has taken place in the Imperial Parliament on the subject of adulterating tea, beginning with the Act (2 George I. c. 3, down to 4 George II. c. 14, and 17 George III. c. 29 and 4 George IV. c. 14) which imposed heavy penalties. According to Mr. Philips, of the Inland Revenue Office, there were in London alone as many as eight manufactories in which exhausted leaves obtained from hotels, coffee-houses and the like were re-dried and faced with rose-pink and black-lead in imitation of genuine tea. The Chinese now, following the example of more Christian nations, prepare and sell for exportation large quantities of spurious tea to English merchants at Canton and Shanghai, and these merchants export it to foreign customers, and pass it through the Custom House with all the forms and oaths attending a legitimate trade and exportation of good tea; so that it is hard to bring those who engage in the trade under the provisions of the Act against the Adulteration of Food. The consuming of this bad tea has a manifestly deleterious effect upon our farmers and their families, for they swallow down, three times a day, or more, cup after cup of *cheap* tea, and enjoy it probably all the more because it is cheap, and besides its being cheap they had a present of a book as a reward for buying it. The book would not probably have been purchased under other circumstances. No wonder our farmers' wives become prematurely old, and instead of preserving in ripier years the vivacity which properly belongs to their more matured condition of mind and body, look like revived mummies with skins dried like parchment. The use of bad tea stands next to the destructive habit of chewing opium. They have nervous complaints, kidney diseases, which in an especial manner are engendered by the drinking of so-called Japan tea; pains in the back, neuralgia and rheumatism, all sure results of taking into the system and overloading it with the deleterious drugs which are used in the adulteration of cheap tea, and the manufacture of cheap tea.

This morbid desire for having things *cheap* in price, regardless of quality, is one of the signs of the gullibility and ignorance of the people of this country.

The Sanitary authorities of the City of London have faithfully endeavoured to suppress the importation and sale of spurious tea. In 1870 there was a large importation of it from China, it was named "Moning Congou" from Shanghai. It consisted of the re-dried leaves of exhausted tea, much of which had become putrid before drying. In China it was called "Maloo-mixture." Maloo being the name of the street where it was prepared, and along the sides of which heaps of this trash might often be seen drying in the sun with filth all around, and dogs and pigs walking over it. In another case they found many chests of spurious "Scented Orange Pekoe siftings" in bond. This tea was shown to have had above one sixth its proper strength; that it had little or none of the active principles of tea; it had an unpleasant odour and an acrid taste. A great portion of it was not tea at all, and the rest of it was composed of exhausted tea leaves under just enough good tea to make it flavour of tea.

The adulterations practised by the Chinese are numerous. Exhausted tea is re-dried and glazed in a very deceptive manner. Millions of pounds of leaves of different plants, other than tea are gathered and mixed with it. Mineral matter, too, in the form of China clay, fine sand, and iron filings are ingeniously incorporated with the leaf before curing, so that it is said as much as from twenty to forty per cent. of impurity is thus mixed with it.

I have given more space and time to this subject of tea, 1st, because of its more general use than of any other article of consumption except bread; 2nd, because of the millions which are worse than wasted in its importation—all capital taken out of the country and lost to our material wealth; and, more than all, on account of its generating diseases which can only have an injurious effect upon the rising generation and their progeny.

Butter and Oleomargarine.—This article has become the subject of adulteration so that legislation has become necessary in order to repress its affording an easy means of deceiving the unwary. The Act of the Federal Legislature provides that every person who shall manufacture for sale or shall offer or expose for sale any article or substance in semblance of butter, but not the legitimate produce of the dairy, and not made exclusively of milk or cream, but into which the oil of fat of animals not produced from milk, enters as a component part, or into which melted butter or any oil thereof has been introduced to take the place of cream, shall distinctly and durably stamp, brand or mark upon every tub, firkin, box or package of such article or substance, the word "Oleomargarine," and in case of retail sale of such article or substance in parcels, the dealer shall in all cases deliver therewith to the purchaser a written or printed label bearing plainly, written or printed thereon the word "Oleomargarine," and for breach of this duty the seller is for such offence to incur a penalty of one hundred dollars.

Maple Sugar, Maple Syrup, Maple Honey.—These articles come to the market so adulterated with glucose that it is hard to detect the deceit; and means ought to be provided for the convenient means of detecting it. The Act of 1878 seems fully to provide for the punishment of the offender in case he is detected in selling such to the prejudice of the purchaser, but the difficulty lies in the application of the law. A farmer brings butter mixed with grease, maple sugar or maple syrup or honey mixed with glucose, and exposes them for sale in the public market. The Market Clerk is not a scientific agent and has no special knowledge which enables him to detect adulterations and less inclination to repress the sale of them. He has taken the collection of market fees into his hands and they are all his care, the municipality have let the market fees and tolls to him at a fixed considerable sum, so that his aim is to make money. It is not to be expected that he will see after the interests of purchasers or farmers. He attends to his own interests and the machinery is entirely lacking to give this wholesome statute the force and efficacy which in the interests of the public it ought to have.

Bread.—Notwithstanding all the legislation and municipal regulations passed affecting the weight and quality it is still the constant subject of adulteration. There is one effectual remedy for this, and only one! which in old times used to be resorted to—and considering how necessary it is to be pure and good for satisfying the hunger of both

the poor and the rich, the infliction for its adulteration ought to be, as of old, with many stripes. A cat-o'-nine-tails at the cart's tail should be dealt out, as in olden times, to the baker who gives short weight to the poor man, or adulterates the quality of bread. He cannot, as does the tea dealer, plead ignorance; he *knowingly cheats* his customers and poisons them; and for that he should be publicly flogged. The pillory and the *thew* were formerly awarded in cases where bread had been found adulterated or of short weight.

The Assize of bread used to be a matter of concern to our municipal authorities, but since the adulteration of food, drink and drugs and medicines has become common and general, of course the baker is let go because this peculiar kind of knavery is only one of many tricks of trade, on the principle of *tu quoque*.

Notwithstanding its prohibition, the use of alum and other spurious articles in bread under severe penalties is still continued. The chief articles of adulteration have been alum or sulphate of copper for the purpose of giving solidity to the gluten of damaged or inferior flour, or chalk or carbonate of soda to correct the acidity of the flour, or boiled rice or potatoes to enable the bread to carry more water and thus produce a larger number of loaves per sack of flour. The art of the baker is exercised to increase the gluten in the way already mentioned or by the means of a gummy mess of boiled rice, three or four pounds of which when boiled for two or three hours in as many gallons of water will make a sack of flour yield at least 100 four pound loaves. This bread is said to be "dropsical" and gets soft and sodden at the base on standing, and quickly becomes mouldy.

Beer and Ale and Compounding Spirits.—The Act to which I have previously referred as passed by the Legislature of the Dominion sanctions and regulates the compounding of spirits and adulterating liquors, and the Government of the country derives a revenue from it; for instance it sanctions the compounding and making imitations of British and foreign wines, brandy, rum, gin, Old Tom, Geneva schnapps, British or foreign whiskey and bitter liquors and cordials.

No one, except those licensed, may carry on the business of a compounder, and he is obliged to designate by a proper label or brand who is the maker, and the place where the article is made; but I find nothing which compels the manufacturer to set forth in his label that the liquors are so compounded.

As to the adulteration of beer and ale, various Acts have been passed by the Imperial Parliament guarding especially against *cocculus indicus* which imparts intoxicating rather than stimulating qualities to malt liquors; 2nd, against those which were supposed to improve the flavour and body of the liquor as grains of paradise, capsicum pods, ground ginger, molasses and salt; and 3rd, those which gave bitterings as quassia, chiretta, horehound, gentian, etc.; and in the country breweries out of London the use of tobacco was frequently resorted to as well as *cocculus indicus*, and Mr. Phillips, to whom I have frequently alluded, expressed the opinion that the cases of brutal and purposeless violence, which were often recorded of those who drank beer to excess, were referable to the maddening influence of these ingredients.

In this country the use of lager beer has become common. Well made of simple malt and hops it is pure and good, possessing slightly exhilarating qualities, and might well take the place of whiskey with those who indulge in the use of ardent spirits and who might be won from a growing taste for strong drink; but adulterated as it often is, with drugs, it is as injurious to the system, and in a sanitary point of view is as much a nuisance as any other adulteration. We know that for purposes of preserving it against acidity, drugs are used to save hops, and when ale in which it has been used is drunk freely, a headache and great nervous prostration follow. The use of this secret drug has been carried to such length by one of the leading brewers of this Province that his bottled ale has almost gone out of use, and lager beer may be and is so drugged that when a bottle is opened it makes a loud report, effervesces like soda water and suddenly falls flat in the glass and never preserves a bead of froth on the top, and the liquor left in the bottle or bottom of the glass suddenly becomes black from contact with atmospheric air. The use of this secret drug, whatever it is, ought to ruin the brewer who employs it by his never being able to sell such trash, instead of the poor unfortunate who, ignorant of its bad qualities, suffers from the effects of its poisonous and leady properties.

Sugar is of course contaminated, like other articles of food, by adulteration. Its manufacture from starch has become an important industry. We have heard of old rags too, being employed as a raw material. It is sent into the market under the names of grape sugar, glucose corn sugar, saccharum, and British sugar. Factories have become common, and the industry is booming under the ægis of the National Policy, and its manufacturers soon become millionaires. Just in proportion as they become rich, the people become pauperized by their having to pay for, and use as sugar, that which does not sweeten as does sugar. We pay the price of the superior article for that which is a fraud and a deceit.

It was at one time chiefly used for brewing purposes, but it is largely employed now for adulterating brown sugar, for making confectionery, jams, marmalades, and fruit jellies.

The conclusion to which I would point on this subject is not merely that legislation should take place and that officers should be appointed to carry out regulations for sanitary purposes, who secure their salaries and do nothing further, because we know that in all these things a single eye is kept upon the exigencies of political party. I have myself been a Commissioner of Tavern Licenses and I know something of the true inwardness of all such efforts towards Social Reform. I know how much party ends and how little reform—are aimed at. We want this subject of Sanitary Reform not merely aimed at, talked about, enquired into and reported upon, but we want the evil removed by an intelligent, scientific and determined Commission, with back-bone to inquire and ascertain, and power to deal with and abolish it. Apologizing for the length of my paper which was owing to the want of time to condense it, I will now say in conclusion that I hail this movement with the heartiest welcome and the fullest desire to coöperate in the workings of the Commission to the utmost of my ability.

A discussion on the subject followed, participated in by a number. Dr. Oldright said it had been found that in watered milk cream rose more rapidly to the surface than in pure milk. Hence though a milk might show a large percentage of cream, it might be of a low specific gravity, and poor in its other constituents. On the other hand the lactometer, if used alone, might mislead; as a milk rich in cream might, for that very reason, give a low specific gravity. He supposed that the percentage of cream and the specific gravity (as indicated by the lactometer) ought to be considered together. He would like to hear on this point from Dr. Ellis, or other gentlemen present.

Dr. Ellis concurred most heartily in the manner in which Judge Hughes had characterized the individuals who practised adulteration, and believed that the authorities would have to deal with them as persons guilty of fraud. The great bulk of adulterations were not, however, deleterious, because they would spoil the sale if the article was made injurious. From a sanitary point of view adulteration of food has great importance. Milk, upon which the young and the sick depended for life, should be kept pure and undiluted. Bad as adulteration was, he felt inclined to think the practice was on the decrease in America, or at all events not increasing. It had decreased in England. The lactometer was only for taking the specific gravity of milk, and nothing else. The addition of water to normal milk lowers the specific gravity of milk. But the composition of milk is complex, and while the butter contained in milk is of lower specific gravity than water, the solids, sugar, caseine, are of higher specific gravity than water. Therefore the specific gravity of milk results from these two factors, and depends on the amount of sugar and caseine. Variations in the specific gravity of milk varied from 1,025 to 1,033 or 1,035. If milk was unusually rich in cream it would have a low specific gravity, so that judging from the lactometer test alone one would say it was watered. Watered milk would throw up cream to the surface more rapidly than pure milk. The lactometer should only be used, he thought, as a preliminary test, to be followed by analysis. With regard to teas referred to in the paper, all green teas are, he said, faced, the best as well as the inferior qualities. Facing consisted in applying Prussian blue and China clay. Copper, Dr. Ellis said in answer to a question, was not used in green teas.

Dr. Yeomans thought the moral aspect of the question presented by Judge Hughes particularly important.

Dr. Wilson, M.P., commenting on the paper read by Judge Hughes, said that if apprentices were trained to systematic chicanery and fraud, then it was a very serious matter and called for action.

Mr. Coatsworth, in reply to a question, stated the methods adopted by the food inspector of Toronto in inspections of food.

The following resolution was thereafter adopted, viz., that the Chairman appoint a committee to consider and report on desirable amendments to the Inspection of Food Act, with a view to secure the prompt inspection and analysis of suspected commodities at the instance of private consumers: Drs. Yeomans, McLarty, and Messrs. Coyne, Farley and Casey were appointed a committee.

A committee to inspect and report on sanitary apparatus, consisting of Drs. Oldright, McLarty and Luton, was likewise appointed.

The Convention adjourned.

Evening Session.

The Convention was resumed in the evening by the reading by the Secretary of the following letter from Dr. Carpenter, of London, England.

DR. CARPENTER'S LETTER.

“CLIFTON, NIAGARA FALLS, Sept. 12th, 1882.

“DEAR DR. OLDRIGHT.—I should have been very glad to avail myself of the kind invitation which you have given me on behalf of the Committee of Management of the Sanitary Convention which is about to meet at St. Thomas, if it had not been that I am under an engagement made before I left home to be in Saratoga on the very same dates.

“I shall be obliged by your assuring the promoters and members of the Convention in any way you may deem most appropriate, that I cannot wish anything better for the physical welfare of the rapidly increasing population of your important Province than that the provisions of the Act which the wisdom of the Legislature has adopted should be carried into effective operation by the concurrence of an enlightened public opinion with the efforts of those who are charged with its administration. It may be impossible so to educate an adult population as to induce them to make sacrifices (or what they deem to be such) of their vast rights and interests for the common good. But I have great confidence that, by the judicious diffusion of sanitary knowledge among the rising generation, they may be led to see that their own individual rights and interests are really identical with the rights and interests of the community of which they are members, and that thus they will become zealous co-operators in sanitary work, instead of adding to the dead-weight of indifferentism, or, still worse, becoming active opponents of sanitary reform that may directly or indirectly tax their pockets. To this end I would strongly recommend the teaching of elementary physiology to the upper classes of every Public School: and this, not by loading the memory with a mass of anatomical detail, but by practical illustrations, which they can themselves appreciate. Thus I would have every child instructed in the circulation of the blood and the double nature of its work in nutrition and oxidation, not only by demonstration of the structure and actions of the heart and lungs, but by the exhibition of the capillary circulation in the microscope, the passage of expired air through lime-water (contrasted with the nonprecipitation of the lime by pure air), and the experience of the distress induced by breathing of a bladder full of air over and over again: with the affect of air thus charged with carbonic acid in extinguishing a candle, which is relighted by being plunged in oxygen. It is within my knowledge that the impressions thus produced are far more vivid and enduring than any that instruction, or the reading of lessons are likely to leave on the average mind. You have in Toronto so excellent a Normal School that I feel sure that this subject cannot be lost sight of, and what I want specially to urge, is the importance of making the individual experience of every scholar go along with the instruction of the teacher. The circumstances of your country are so different from those of ours, that I feel it would be presumptuous in me to offer any criticism in regard to the provisions of

your Sanitary Act. One of the greatest of our evils is the over-crowding of the lowest class of our town population in dwellings unfit for human habitation ; and the condemnation of these, and their replacement by healthy edifices is one of our greatest practical difficulties, which cannot be solved until Parliament gives power to a municipality to estimate the compensation to be given, not according to what the owners of such property have actually received as rental, but according to the saleable value of the sites for the erection of blocks of working-class dwellings that shall pay a fair rental on the capital invested. At present we have large areas of ground in London and our chief provincial towns which have been cleared by the municipal authorities, but which none of our building societies take up, because those authorities can only recoup their expenditure by asking prices for the sites which the societies cannot afford to give. I mention this not as having any bearing on your present condition, but for the sake of showing what you will have to avoid when the increase of your principal towns and the over-crowding of their denser parts may come to render legislative interference necessary.

“What strikes me is the problem which, beyond all others, you should set yourselves to solve is the disposal of the *excreta*, not only in such a manner as to be innocuous, but so as to be turned to beneficial account. Thus, in Toronto, I see plainly that the closing in of your harbour by the island (or rather promontory), and the want of tidal or current movement in the waters of the lake, make it most undesirable that the sewage of the city should be any longer discharged where there is a certainty of its future accumulation, in a degree most injurious to health. From what I have gathered of the generally level character of the great lake district, I suppose that the like difficulty must be experienced in all towns whose drainage cannot be conveyed into the stream of the St. Lawrence or its tributaries. Moreover, I notice in nearly all the land I have passed over a poverty that will tend to increase if the *excreta* of its human as well as animal population are not returned to it. Knowing how careful the farmers in many districts of France are to utilize these, I think it very probable that some system exists among the *habitans* which English settlers may adopt with advantage. And I would merely suggest that your Convention should specially turn its attention to this point, if it has not already done so, since the maintenance of the fertility of the longest settled parts of your Province must ultimately depend upon the restoration, in some way or other, of what is being continually taken from the soil. At present we, in England, are digging for phosphatic nodules, and sending out fleets of ships for guano, while we are at our wits' end to dispose of our sewage.

“In some of your new towns it may be possible to carry out the system of separating the house-drainage from the surface-drainage ; run the former into tanks at street crossings, whence it may be pumped up and carted off during the night to be distributed to the neighbouring land. I know that this is done with great success in a few places in England. And I think I mentioned to you the very satisfactory results of a similar system privately carried out by my friend and old pupil, Dr. J. Langdon Down, in regard to the drainage of his large establishment for idiots at Hampton Wick, near London. This contains a population of about 300 (patients and attendants), and he has garden ground to utilize the whole of it. I never saw finer crops of potatoes and other garden stuff than in his grounds, and I can personally testify that even when the sewage has been freshly distributed no unpleasant smell arose from it. It never lay on the surface. I am sure that if you wish for detailed information as to his methods, Dr. Down would gladly supply it. I trust that you may be able to secure for the Province some kind of compulsory vaccination. Perhaps the requirement of a certificate from school children would suit you best. I see that there is a severe outbreak of smallpox at a town in the States.

“With these suggestions, I conclude by again wishing most cordially all success to your Convention.

“Believe me,

“Yours faithfully,

“WM. B. CARPENTER.”

After the reading of Dr. Carpenter's letter, Dr. W. H. Ellis, Public Analyst, read the following paper on

"CONTAMINATION OF DRINKING WATER."

MR. CHAIRMAN, LADIES AND GENTLEMEN,—The notion that sickness may be caused by drinking bad water has long been familiar to all. But the part which drinking water may play as a carrier of the contagion of certain diseases has only of late begun to receive the attention which is due to it. This is however by far the worst danger that we have to fear in this connection, both because the diseases which are so spread are more malignant than those caused in other ways, and because a water which is otherwise unwholesome is usually also unpalatable, while a water charged with the germs of Typhus or of Cholera may be clear, sparkling and delicious.

This is a point on which it is most essential that we should all have clear ideas, and, therefore, in several ways, let us consider what is pure water and what is unwholesome water.

Absolutely pure water is never found in nature. Water has such large solvent powers that it always contains in solution more or less of the materials with which it has been brought in contact. When we wish to obtain chemically pure water in the laboratory we distil it, *i.e.*, we make it boil, and then condense the steam. For example, if you put a lump of sugar in a glass of water you know the sugar will dissolve; if now you make the water boil, the water will be converted into steam, so that if we go on long enough we can drive off all the water and get back just as much sugar as we put in; and if we collect the steam, which we can do by making it pass through a cold tube, we find that it contains no sugar at all; nor is it necessary to boil the water. A degree of heat much less than 212° will convert the water into vapour, only we must take a longer time. Now, this is just what is taking place on a vast scale in nature. The water of a river or lake is constantly dissolving small quantities of the various rocks and soils, over which it flows, or which form its bed, and these dissolved matters are continually being carried down to the sea, so that the sea really holds dissolved portions of almost all elements known in the earth. But from the surface of the sea and of all lakes and rivers water is constantly rising in the form of vapour into the air, and this vapour is being condensed in the form of rain. This condensed water or rain is free from the solid matters which are dissolved in the sea and in rivers, and constitutes the nearest approach to pure water that we find in nature. But even rain water is not absolutely pure because it dissolves a little of the various constituents of the air in falling through it and thus contains small quantities of the constituents of the air, *viz.*, oxygen and nitrogen, and also varying quantities of carbon dioxide and ammonia, which only exist in the air in minute proportions but which are very much more soluble in water than the oxygen and nitrogen.

Rain water contains of

(a) Dissolved gas, 7 cubic inches in a gallon.

Composed of 3.2 per cent. oxygen.

" 2.5 " carbon dioxide.

(b) Solids, 2.5 grains per gallon.

When the rain falls upon the ground, part again passes off as vapour, part runs off by streams; and part sinks into the ground. The proportion sinking into the ground varies from 20 to 90 per cent., with the nature of the soil, etc. In the ground it absorbs carbonic acid, which is abundant in the air, contained in the interstices of the soil, and thereby becomes capable of dissolving relatively large quantities of carbonate of lime, etc.

The composition of spring or deep well water necessarily varies greatly. It generally contains more or less dissolved mineral matter, carbonate and sulphate of lime, and magnesia, chloride of sodium, etc., but little organized matter, and is generally bright, sparkling and palatable.

River and lake water is still more variable in its composition because it is derived from such various sources. It of course consists of the drainage from the district where

the river rises and through which it flows. If this district be uncultivated and covered with forest it will contain more or less organic matter derived from decaying vegetation, often to the extent of imparting a brown tint to such a water, as in the case of the Ottawa. If the district be cultivated, it contains organic matter derived from the drainage of the fields; and if the district be thickly populated, it will contain organic matter much of which has an animal origin.

We find then that water, however derived, contains always more or less dissolved mineral matter varying from 2 to 100 grains per gallon, and more or less dissolved organic matter.

With regard to the mineral matters, when not in such excess as to make the water unpalatable, they are comparatively harmless; although many diseases have been more or less justly attributed to the use of water containing various kinds of mineral matter. It is not with these however that we have to concern ourselves at present.

As to the organic matter, we may observe that it is impossible to obtain water for drinking purposes entirely free from it. Even rain water sometimes contains as much as one third grain per gallon. Then again, it is not the quantity of organic matter that does the mischief. A glass of cider or a cup of beef-tea are loaded with organic matter, contain a thousand times as much as a water which may act as a virulent poison. It is the quality of this organic matter that is the all-important matter.

We have seen that the organic matter contained in a water may be derived from decaying vegetation, as in the case of a river draining a forest covered area, or a stream having its source in marshy land. Water of this class is usually spoken of as "peaty;" and, without hazarding any general assertion as to the wholesomeness of such waters, we may safely say that organic matter of this character, when in the minute quantity in which it is usually found in public water supplies, is without any very serious effect on the public health.

Rivers derived from or mixed with the drainage from cultivated fields occupy an intermediate place between this class and the next class. As whatever may be said of the dangers incident to their use, applies much more strongly to the next class, we may pass them over for the present.

Rivers into which public sewers are emptied are always dangerous. We all know what a sewer is, and we are all acquainted with the general character of sewage, and apart altogether from questions of public health, we should most of us shudder at the bare idea of drinking sewage even in a highly diluted form; and yet this is what a great many people are doing every day of their lives.

A river flowing through a town or a thickly populated country, is everywhere the repository of a vast quantity of filth. It is true that in large rivers this filth is largely diluted, and it is true too that in rapidly flowing and well aerated streams the organic matter is more or less quickly oxidized and burnt up, so to speak. Still a sewage-polluted river is always a more or less suspicious source for a public water supply.

But it is not rivers alone, or even chiefly, that are contaminated in this way. Wells in towns and villages are often—I might almost say always—so polluted. Towns are usually built on a more or less porous soil, and through this porous soil wells are dug; upon the surface or a little below the surface of this porous soil is daily poured, in almost every town, an amount of filth which only one who has made a study of this subject can fully realize; but of which any one who gives the most casual attention to the matter can form an idea, however below the truth it may be, which will be sufficiently startling when one reflects that it is continually soaking through the porous soil into the wells which supply drinking water to our populations.

Now, I repeat that this is a state of things which, quite apart from questions of public health, can only be tolerated because it is ignored. Even if diluted sewage is a wholesome beverage, it is one which no one would willingly and knowingly drink, and one no one should be obliged to drink, as too many of the inhabitants of our towns are forced to do, simply from the absence of any supply not so contaminated. But we can go much further than this. Sewage-polluted water is always dangerous, and sometimes it is deadly.

I am perfectly ready to admit that a water containing organic matter may be taken without affecting the health of the consumer. I go farther, and I grant that water

loaded with fæcal matter may be drunk for a considerable time without any apparent injury; but very generally it does produce injurious effects on the health of those who drink it, and under certain circumstances, which I now propose to consider, it acts as a swift and certain poison.

Twenty years ago Dr. Budd pointed out that Typhoid fever was a true eruptive fever in which the intestinal ulcerations played the part of the cutaneous eruptions of such fevers as Scarlatina and Measles. He also showed that as in Scarlatina the specific contagion of the fever resided chiefly, if not entirely, in the exuviae of these ulcers, and he calculated that every year in England alone from 100,000 to 150,000 intestines affected with the eruption of Typhoid Fever continue each for a period varying from a week to a fortnight to discharge the exuviae containing the specific contagion upon the ground, or in the sewers. Now, what is poured into sewers runs into rivers, and what is poured on the ground has a very good chance of getting into wells, and here we at once see looming up a danger which even when only a probability, nay, even if only a possibility, is well calculated to appal any thinking mind. But the communicability of Typhoid through the medium of drinking water is very much more than a probability—it is a thoroughly established fact.

Since one good example is often more conclusive than a host of general considerations, I shall now proceed to recite a few cases which, I think, prove beyond doubt what I have just stated, viz., that Typhoid fever may be and is communicated by drinking water.

1. *Dr. Budd.*—In the last week of October, 1856, there was a case of Typhoid fever in No. 13 Abbotsham Place, London. Close to the partition wall between No. 13 and No. 14 was a well which supplied four houses. On the first week in November, the water from this well suddenly acquired a taste and smell which left no doubt that it had been contaminated with sewage. The inmates of No. 15, one of the four houses supplied, immediately abandoned the use of the well; the other three houses continued to use it for some days longer. On the 13th, the mother of the family living in No. 14, was seized with Typhoid, in a day or two, three of her children were also attacked. Simultaneously with these four cases, there occurred two cases in No. 12 and two in No. 13. The family in No. 15, who did not drink the well continued in perfect health. The families had held no intercourse with each other, and there were no other cases in Abbotsham Place.

2. In 1847, Richmond Terrace, Clifton, contained thirty-four houses of a good class; at the end of the Terrace was a pump, from which thirteen houses drew their drinking supply. In the latter end of September it became tainted with sewage—a fact verified by the discovery of the actual leakage. Early in October Typhoid broke out at once in all the thirteen houses where the tainted water had been drunk. In none of the other houses of the Terrace was there any fever. There were two girls' schools in the Terrace; one of these used the water from the infected pump, the other did not. In the first, eleven persons out of seventeen were struck down with fever; in the second, there was not a single case.

3. In September, 1860, thirty-one sisters of the convent of the Sisters of Charity in Munich out of 120 were seized with Typhoid. An investigation brought to light the following facts:—

The convent was situated close to the hospital. In the spring of 1860 a well was dug in the hospital to a depth of twenty feet; this well was two feet from the laundry in which the clothes of patients were washed, and the water from which was drained into the porous soil surrounding the well. It was shown by microscopic and chemical examination that the well was contaminated by the water from these drains. This well was used for the hospital laundry, but between the 17th and 28th September, on account of repairs, which rendered the supply of water in the convent insufficient, the water from this well was carried by pipes into the bath-room and kitchen of the convent. It was intended for use in the kitchen, and for baths and washing, and it was recommended that water from another source should be used for drinking. But it was found that it had been used for drinking, and all the patients acknowledged having drunk this water. As soon as the use of this well was discontinued, the epidemic ceased.

4. *Dr. Sheriff*.—A house at Ratho, Scotland, had been inhabited for forty years, and had been considered salubrious. In April, 1865, it changed hands, and a number of workpeople were constantly employed there for several weeks. In July, the family took possession, and on the 23rd, Typhoid fever broke out, and nineteen persons in all, members of the family, servants and workpeople, were affected. It was found that the cesspools communicated with the well by soakage, and Dr. Sheriff, who reported the case, finding this, and finding also the water of the well as shown by chemical analysis to exhibit proofs of sewage contamination naturally concluded that the fever was caused by the infected drinking water. But he adds :—

“The question may be naturally asked, How came it to pass that the workpeople employed about the house before the family took possession were not affected ?” And he answers “that they only used the water occasionally for drinking purposes and neither had their meals cooked, nor slept in the house.”

He seems not to have been aware of the fact that shortly before the appearance of the first case, a groom came to the house ill with Typhoid fever, from Dundee.

The conclusion seems obvious ; for weeks the water from the polluted well was used by numbers of persons without causing any apparent ill effects. Then we have in addition to the ordinary sewage, the excreta of a Typhoid fever patient introduced into the well, and at once the outbreak follows.

5. At Solothurn, in 1865, occurred an epidemic of Typhoid. It was found that all the patients had used water from a certain aqueduct. Houses not supplied from the aqueduct escaped entirely. A barrack was supplied from the aqueduct, 100 cadets were moved in from other cantons, forty-two were attacked fourteen days after.

It was found that a brook, which passed through the court of a lunatic asylum and received its sewage, emptied into the aqueduct. In this asylum, a nurse from a Typhoid locality was taken ill of Typhoid, her clothes were washed in the wash-house of the asylum and many of them soaked in the brook itself. She was taken ill in the middle of July and died on the 8th of August. After the middle of August an epidemic appeared throughout the entire locality supplied from the aqueduct.

The celebrated epidemic of Typhoid which occurred at Lausen, in 1872, a village which had been free from the disease since the passage of the allied armies, in 1814, and which was distinctly traced to the contamination of the public water supply, by the excreta of Typhoid fever patients through the porous soil of a hill of considerable size which had once been the moraine of a glacier is too well known to need more than mentioning.

One might go on almost indefinitely multiplying similar cases, but enough has been said to show how jealously we ought to guard our water supply against the possibility of sewage contamination.

The conclusion of Dr. Ellis's paper was the occasion for loud applause.

Dr. Yeomans recited some instances arising in his own practice in support of the proposition advanced in the paper regarding Typhoid Fever.

Dr. Oldright believed it must be apparent to every one that there must be a divorce between our wells and the present system of disposing of sewage matter. He alluded to the practice of filling ravines in towns and cities with refuse and filth, on which afterwards houses were erected to the detriment of those who inhabited them. He was glad our eyes were being opened to the necessity of these sanitary reforms.

In reply to questions Dr. Ellis said water well filtered was better than undoubtedly impure water, though he should be sorry to drink filtered water. It would, he should think, improve water contaminated by sewage to boil it.

The discussion on this interesting topic became general, and Dr. Ellis was called upon to answer a number of questions.

A vote of thanks to Dr. Ellis for his paper was passed.

Dr. R. W. B. Smith, Sparta, next read the following paper on

“CONTAGION.”

MR. CHAIRMAN, LADIES AND GENTLEMEN,—The selection of this topic has been made with the hope that in the discussion thereon some light may be diffused upon a subject which cannot be too well understood by the general public.

Contagion may be defined as the agent by which a disease is transmitted; and a contagious disease is one which is capable of being communicated from one animal to another, either of the same or some other species. As to the primary origin of the various contagious poisons and whether they are capable of being produced *de novo*, at the present time there is much doubt. There is a probability that a few of the contagious diseases are generated by some distinct action, but the majority of these affections are communicated from one human being to another, while others are transmitted by some other animal to man.

The contagion may exist in different forms and may be given off in as many different ways. For example, in one class of diseases it is associated with parasitic animals or plants, or their germs; while in another class the contagion is believed to be connected with organized plants or cells, such as those of tubercle or Cancer. It may also exist in the contents of vesicles or papules, or in the substance of a dried scab which follows a pustule, as in the case of Smallpox. Pus or other materials derived from some inflamed or ulcerated surface may convey the contagion, as in the case of puerperal Peritonitis, Syphilis, etc. The exhalations and excretions of the body may contain the germs of a disease. The contagion of Whooping Cough exists in the breath alone; while in some other disease it seems to be present in all the exhalations as well as the various secretions of the body. The epithelium which is cast off in Scarlatina contains a great deal of the poison of that disease; while in Cholera and Typhoid Fever the feces are believed to be alone capable of transmitting these diseases. Hydrophobia is an instance of how from contact with the saliva of the affected animal the disease may be conveyed. Thus we notice that the conditions under which the poisonous germs of disease may exist are many and varied, and that the modes by which these germs of disease are propagated are also numerous.

In considering how the contagion may be conveyed from one individual to another, we notice that a few diseases can only be transmitted by bringing the substance in which the poison is found into close and intimate relation with the minute vessels of the tissues, so that immediate absorption may take place. This is the only method by which Syphilis and Hydrophobia can be transmitted. Another method of communication is by direct contact, as in the case of parasitic diseases. It is particularly through mucous membranes that poisons may enter in this way, as is well illustrated in the various forms of purulent Ophthalmia. Many contagious diseases are transmitted without there being any immediate contact. In such cases the poison may be given off into the atmosphere and inhaled, or it may enter the system of another person through the pores of the skin. The poison might also come in contact with the food or milk, and thus pass into the system; or it might become attached to articles of clothing or bedclothes and by this means be propagated. Cases of this kind are common where clothing has retained the poison of some disease for a long time, and ultimately been the cause of another outbreak of the disease. Flies and other insects are believed to be a means of propagating some diseases, by alighting first on diseased and then on healthy persons. Drinking impure water is a most dangerous medium of conveying the poison of Typhoid, in consequence of the excreta through defective drainage finding their way into wells. When the poison of a disease reaches a person it attaches itself to the skin as well as the mucous membrane of the mouth, nose, throat, and respiratory passages. It then passes through the thin membranes, or becomes imbedded in the thick mucous tissue, and thus reaches the minute capillaries and lymphatics by which it is conveyed through the system.

We now come to the brief consideration of the

Degrees of Contagiousness of the different Diseases, and their Modifying Influences.

The certainty of transmission of different contagious diseases is exceedingly variable. Some, such as Smallpox, are readily communicated; while others, such as Typhoid Fever, are not nearly so likely to be transmitted. The chances for a contagious disease being produced will vary according to the quantity and strength of the poison which reaches the system, and also the time at which the poison is communicated. Much will depend upon the state of health, previous habits, and constitution of the person to whom the contagion is applied. A previous attack of a disease generally modifies, if it does not protect a person from, a fresh attack. Climate and season have a marked effect on different diseases, some requiring a high temperature for their development, others being checked by much heat.

The Nature of Contagion.—There is much dispute among writers as to the nature of the active principle by which the ordinary infectious diseases are propagated. But it is conceded that in connection with each disease there is a specific poison, capable of originating this one and no other; and without the action of which on the system the disease cannot possibly occur. With respect to the nature of this virus there are various theories. The Germ Theory, the one most commonly entertained at the present time, teaches that every contagious disease is due to living germs specifically distinct from all others. Two distinct theories, however, exist in regard to the precise nature of these germs: (1) It is believed by the majority that they are in reality *microscopic parasites* belonging either to the vegetable or animal kingdoms, such as minute fungi, bacteria, etc.; and bodies of this nature have been described as having been observed in the contents of vesicles, secretions, excretions, etc., in Smallpox, Typhoid and other diseases. (2) Beale, Simon, and other pathologists, claim that the germs are not parasitic, but that they are extremely minute particles of living germinal matter or bioplasm, which present no difference in appearance in different diseases, even under the highest power of the microscope, but have an essential difference in *vital power*.

The Effects of the action of Contagion upon the System, and the Changes it undergoes.—As a rule the first action of the morbid principle is on the general system, and this is usually followed by local lesions. When the virus of some particular fever enters the system it is generally believed to produce some primary change in the blood; while some assert that it acts first on the nervous system. The blood certainly becomes altered in its physical and chemical characters, its fibrine being especially diminished. Many suppose that a fermentative action is set up. The germs rapidly multiply, probably at the expense of the albuminous elements in the blood, and hence the smallest particle of a contagious poison introduced into the body may generate an innumerable quantity of the same poison. The symptoms of the disease are preceded by the period of incubation, which differs in duration according to the disease; and then follows, as the result of the development of the virus in the system, the malady itself. Should the disease progress favourably, after a certain period the symptoms subside, and the poison, ceasing to increase, is finally expelled altogether out of the system.

We next notice the

Hygienic Treatment of Contagious Fevers, and the Methods Necessary to Prevent and Limit an Epidemic.

When a physician finds himself in charge of a patient suffering from an infectious fever, he has, in addition to the vigilant care of his patient, another important object to be kept in view, viz.: to prevent the transmission of the disease to others; and the measures which prevent this end should be understood by all.

1. Complete isolation should if possible be secured, and everything which might serve to convey the contagion should be destroyed. An example of the utility of this measure is seen in the success which followed the stringent sanitary measures taken to prevent the spread of Smallpox in this city recently. The patients, as soon as the symptoms of the disease were manifest, were at once isolated, and the clothing, etc.,

burned. To the timely action of the authorities in this instance is probably due the prevention of what might have been a serious epidemic. St. Thomas should congratulate itself on having had a physician in the civic chair during the past year.

2. Ventilation is essential in every sick room, and this can readily be secured by freely opening the windows, care being of course taken to protect the patient from draughts. All excessive bedclothes, carpets, and curtains should be removed, and the room, as well as the patient, should be kept as free from dirt as possible.

3. Those coming in contact with the patient should avoid inhaling his breath, and should afterwards clear out all saliva from the mouth, and thus avoid swallowing it.

4. The discharges and exhalations from the patient should be *at once* disinfected. The air of the room should be somewhat impregnated with some valuable disinfectant. The spray from a weak solution of carbolic or sulphurous acid is excellent for this purpose. Secretions from the nose or mouth should be removed by disinfected rags, and these at once burnt. The excretions should be removed in utensils containing some disinfectant. This is especially necessary in cases of Typhoid Fever and Cholera, in which it has been established that the contagion is conveyed by the discharges from the bowels. The best disinfectants for this purpose are carbolic acid and the chlorides of zinc or lime. Food should not be allowed to remain long in the room, etc.

The washing of the clothes which have been in contact with the patient is often a means of spreading the disease. To avoid this it is well to sprinkle the clothes thoroughly with a solution of permanganate of potash before taking them from the room. The room in which the patient has been confined should be thoroughly washed and carbolic acid added to the water. White-washing the room is also an excellent method of lessening the danger of the disease spreading. These measures are essential in proportion to the degree of contagiousness of the disease.

When it is first discovered that an epidemic threatens to invade a community, additional precautions are called for, and a thorough attention to proper hygienic conditions should be made compulsory. To accomplish this, competent and intelligent persons should be appointed, whose duties would be to go from house to house and enforce an obedience to sanitary laws. They should notice that the following practical points are observed :—

1. Cleanliness, including frequent cleansing and white-washing of the premises, and free ventilation.

2. Special attention must be paid to *house refuse* as well as all other decomposing organic matter, which should be promptly removed after being disinfected.

3. The sinks and drains about the house, the sewers, water-closets, and all low ground about which foul matter might accumulate, should be inspected and stringent measures taken to secure their purity. Disinfectants should be freely used during the cleansing of any premises.

4. The water supply of every household should be looked after, and care taken that no organic matter gets into the wells, which too often are near drains, or may be dug in ground where from the proximity to some stable or cesspool the earth may be saturated with organic matter. The water used for drinking should be filtered before using. The milk supply should also receive attention. The milk from cows fed on refuse from breweries has been pronounced impure.

5. When any preventive to an epidemic is known, advantage should be taken of this knowledge. For example, Vaccination should be made compulsory, and should be thoroughly enforced in the case of all who have not been previously vaccinated.

In short the duties of a Health Inspector should be to see that all measures having a tendency to check the spread of contagious and infectious diseases should be thoroughly enforced; and that all causes to which might be assigned the origin of such diseases are promptly removed.

The blind indifference to the prevention of disease, which has so largely existed in the community, is commencing to show signs of disappearing; and we may indulge in the hope that in the near future *at least* as much interest will be manifested in the *prevention* as in the *cure* of disease.

Rev. Prof. Austin, Alma College, St. Thomas, thereafter read a paper entitled,

“THE PUBLIC SCHOOLS AND THE PUBLIC HEALTH.”

MR. CHAIRMAN, LADIES AND GENTLEMEN,—The work of Sanitary Science in the prevention and removal of disease is very nearly allied to the great scheme of human salvation—in fact may justly be regarded as a part of the work of the Gospel, and of the mission of Jesus Christ to earth. Men miss very much of the scope and meaning of the Christian religion who limit its operations to purely spiritual concerns, and relegate its practical benefits to the life to come. In all ages there have been multitudes of men so carried away with the superior importance of the spiritual life as to be unmindful of the claims of this fearfully and wonderfully constructed temple we call the human body. Some have even claimed to derive sanction for such views from the religion of Jesus Christ. But where, it may be asked, in the teachings of the Son of God are men taught to ignore the body or the present life? Surely not in his precepts, for He taught men that their bodies were temples of the Holy Ghost, constantly guarded by Divine Providence, and hence worthy of the best human attention. Surely in Christ's miracles He does not ignore the body or the natural life, for He heals it of every malady, and thus earns for himself the title of the Great Physician. Indeed, one distinguishing feature of Christ's teaching is its perfect adaptability to the physical relationships of life as well as to the spiritual, so that his followers have promise of the present life as well as that to come. So high is the estimate Christianity puts on the physical nature and the present life, that wherever it obtains, the various sciences that cluster around the human body rise up spontaneously into importance and dignity. Contrast, if you will, the medical science of the Indians or the Chinese with the progressive, critical, and far-reaching medical sciences of Christian lands.

The point I wish to make clear is this: Christianity is eminently practical, and its precepts should be applied to the body as well as to the soul, to the present life as well as to the future, and hence sanitary science and sanitary reform have special claims upon all Christian people, deserving not merely their endorsement and sympathy, but their active co-operation. And that there is urgent need of active and general co-operation in the great work on the part of all good citizens who can doubt? The people perish to-day as of old for lack of knowledge. Men sicken and suffer and die all around us, not because the course of nature is complete, but because they know not the laws of their own being—the very A B C of practical education. Men die, not because of old age, but because they know not how to escape the shafts of death shot at them out of impure air, or the poison of impure food or drink, and because they know not when sick how to apply the simple and effectual remedies of nature about them. Knowledge costs both time and money; ignorance costs both time and money and life itself.

Who can contemplate the constant ravages of disease in the destruction of the physical powers, the blighting of promising lives, the blasting of human hopes, and reflect that in the vast majority of cases these ravages are preventible and unnecessary, without an earnest desire to combat and destroy it. The evidence of the urgent need of this movement in the way of sanitary reform is patent to the sense of sight and the sense of smell on every hand, while the fearful destruction of life wrought by zymotic diseases is well known to all who have investigated. Now, to whom are we to look as the leaders of this sanitary reform—as the educators of the people in sanitary science? What class of society is best calculated to arrest and fix public attention upon the great evils being suffered at present, and to banish the dense ignorance on matters of health and disease that prevails so alarmingly in society? Our minds naturally turn to the physician, whose whole life is supposed to be devoted to scientific research and conflict with disease and death. He, from his very position among men, is the natural instructor of society on sanitary matters. From his knowledge and experience, from his wide range of acquaintance and influence, from his direct intercourse with the sick and suffering he derives invaluable opportunities of imparting that instruction with which the health and happiness of the people are so intimately associated. And there can be no question that society in general experiences the benefit of a great deal of private and

gratuitous instruction that aids materially in keeping down the ravages of zymotic diseases and increasing the average of public health. But while giving physicians their due credit, it may justly be doubted if they can ever be the chief, much less the sole agents, in this work of sanitary education and reform. Some of their number are as little interested in matters regarding public health as those who know less of the sufferings and needs of society. Many of the most talented are worn out with professional duties, and all of them from the very exigencies of the case have to restrict their work chiefly to the healing of the sick, and leave the work of instruction and warning of the masses to other hands. The minister of the Gospel, as the follower of Him who went about doing good to the bodies as well as to the souls of men, ought to accomplish much in the education of the public on matters of health and good living. Too often the teaching of the pulpit has been largely occupied with controverted points of theology to the neglect of practical teaching regarding the every day life. Could not many a sermon on disputed points of doctrine, alike above both preacher and people, be omitted with advantage in favour of instruction on the practical Christianity of better living. Ministers themselves are partially responsible for the idea which is altogether too prevalent that religion consists in church attendance, song, prayer, and collections. People should be taught that to live according to the laws of God written within us, to enjoy good health and promote it, to have a healthful home and preserve it such—that these are an important part of religion. Men ought to be taught by the pulpit that he who knowingly violates the laws of nature is a sinner in need of Divine pardon. They must come to understand—and I think it the business of the pulpit to cause them to understand—that the laws of nature written on their being are the laws of God, and just as binding on the heart and conscience as if written on the inspired page. I would not secularize the pulpit—I would not detract one iota from the amount of teaching on matters purely spiritual, yet I would vote heartily for the introduction of plain and pointed application of Gospel truth to the every day life of the people—even if some powerful and eloquent and ponderous and learned discourses on controversial theology had to be omitted. Yet ministers, with their multiplied labours, can be helpers only and not leaders in this work of sanitary reform. To whom then can we look as the principal agents in this work? Our answer is to the teachers of our youth. They deal with the most important class to reach. Instruction imparted by them in the Public Schools would have a whole lifetime in which to bring forth its fruits. What then, it may be asked, can the Public Schools do for the public health?

1. The Public Schools of our land ought to be utilized to the promotion of greater physical vigour among the youth of both sexes. A robust constitution easily throws off ordinary attacks of disease which cause the weak and frail to succumb. What is required first of all in the battle with disease and death is a higher type of physical manhood. This, it appears to me, is best secured by instruction and training in the schools. And for this purpose I would devote a fixed part of school hours daily. An hour of physical exercise directed by a skilful teacher who knows how to make it at once enjoyable and beneficial would only increase the zest and ability of the pupils for intellectual pursuits. Let it not be imagined for a moment that the ordinary voluntary school sports will answer this purpose of physical development. The boys who take the rough and hearty exercise at school are as a rule the ones who need it least; the weak-chested, flabby-muscle lads are the ones who lounge about with marbles and other profitless games. These are the very ones who need most the stir and excitement of more daring sports. If a lad comes to school physically weak, the course of instruction and training laid out for him should aim at giving him better muscle, purer and stronger blood, and more digestive power. Why should not a defective muscle be toned up by regular exercise as well as a defective faculty of the mind? That such regular physical training would result in a higher type of physical manhood, in a greater ability for intellectual pursuits, and in a higher average of public health we have the best evidences. Dr. Jaeger, whose recent investigations on the influence of exercise and clothing on health has created considerable stir in Germany and Switzerland, found that school children who went through a regular course of gymnastics had 40 per cent. less absences (through illness) charged against them than those who did not. In another gymnasium the difference was 18

per cent. in favour of those taking regular exercise. In a girls' school where gymnastic exercises were regularly given the absences were almost *nil*. Dr. Jaeger also found that soldiers in the third year of their service had a much higher specific weight than those in the first year. The mortality among third year soldiers was 36 per cent. less than among the second year men, and among the latter the mortality was 34 per cent. less than among the new recruits. Still more significant is the fact that the deaths of the older soldiers from Typhoid and kindred diseases were relatively fewer than among recruits and the second year men. He ascribes these results to gymnastics and drill. Exercise, he says, by draining the body of its superfluous moisture hardens the flesh, and hard flesh is sounder than soft flesh.

2. The Public Schools can do much for the public health by prescribing and imparting thorough instruction on Hygiene and the kindred branches of Physiology and Chemistry upon which it is founded. Even an elementary knowledge of these subjects would fix the attention of the pupils on the subjects of health, and the need of care and discrimination in regard to labour and rest, eating and drinking, temperance, and the preservation of vital force, which would in itself be a great point gained. Such a course of gymnastic training and instruction as I have advocated would, of course, necessitate on the part of the teacher a knowledge of the subjects taught, but not a greater knowledge than every well-informed man should have of the nature and needs of the great and complicated machine we call the human body. The great objection to both the instruction and training I advocate—if, indeed, objection there can be—will, of course, be the crowded state of our school curriculum at present and the consequent lack of time. The Public School, says the objector, is for intellectual culture alone, and not for physical, and as it is more important to cultivate memory than muscle, and there is not time for both, gymnastics and hygiene must be abandoned. Grant, if you will, that the intellectual training is the more important, it does not follow that the physical is to be omitted; unless, indeed, it can be shown that the latter is incompatible with the former. The very reverse of this is the case. It may even be questioned if as much literary culture could not be given in five hours daily when an additional hour is given to systematic physical training, as in six hours daily spent exclusively at intellectual pursuits.

But even should it be shown that something now on the school programme would have to be omitted, we do not think this should prove an insuperable objection to the introduction of the instruction and training desired. The branches of the great tree of knowledge have so multiplied in this day of scientific research that an eclectic course of study is a necessity, and the demand of the age is for the practical as distinguished from the theoretical and ornamental. Now what could be more directly and universally practical than the great laws that govern us in our physical relationships and the rules that should govern us in every day life? If, then, a selection must be made, why not take the most intensely practical subjects? For of what use, so far as this life is concerned, is culturing so highly the mind if the body is too weak to bear the strain and pressure of life's battles? Of what use garnishing the jewels till their resplendent lustre dazzles all beholders, if both casket and jewels so soon are to be thrown into the pit? Why be so anxious to increase the size and value of the cargo, if the vessel is so poorly built that the storms will surely wreck her in mid-ocean? Now we are very much mistaken if this instruction and training for which we plead is not really more practical and important in every day life than some of the subjects usually found in the curriculum of the school. Let us take for example ancient history. Outside the professional walks in life of what practical value is the amount of ancient history usually received at school? Leaving out of consideration the mixture of myth and mystery, of truth and fable, of error and exaggeration usually found on the historic page, can anyone for a moment doubt that Hygiene and Physiology would be of more practical use to nine-tenths of our pupils than this branch of study? The very many questions which ancient history presents for our study and investigation may be interesting enough to the historian and pleasant enough as a pastime, but to us in this practical age are not of as pressing importance as more recent problems. Whether Thebes had 100 gates, whether Romulus did really found Rome, whether Alexander untied or cut the Gordian

knot, whether the vision of Constantine was an illusion or a reality, may have been burning questions in the early ages, but after a lapse of a few thousand years they have lost something of their freshness and interest, and hardly arouse as much enthusiasm in St. Thomas as the burning question of the great sewer.

The great problem is how to live best in our day, and for the answer of this problem a man must have some knowledge of the wonderful mechanism of his own body. Now the study of ancient history—and we merely use this subject as an illustration—to the neglect of a knowledge of the human body, its laws and its needs, is about as wise as the study of astronomy would be to the engineer to the neglect of the science of engineering. Go to him and urge him to lay aside the science of engineering for the delightful study of the stars, and he replies, “Why, sirs, other sciences may be useful and pleasant, but to me engineering is an essential branch of knowledge. Of what use for me a knowledge of the constellations if I don’t know my own work? What benefit to me if I could name every star if I run my engine off the track or explode it?” Hygiene and Physiology are as practically important to every man as engineering to the engineer. What is wanted in this sanitary reform is some system at once general and efficient for the indoctrination of the people in health matters, and this system, it appears to me, can only be carried out by the agency of the Public Schools. Instruction and training there given would reach the most important class to be reached, viz., the youth; would be at once general and efficient, and would come home to the minds and hearts of the public with the sanction of the powers that be, and an authority such as no private efforts, however well directed, could possess.

A discussion followed the reading of the paper, in which Dr. Yeomans noted with pleasure that the Education Department has now recognized the importance of hygiene and physiology.

After a vote of thanks to Dr. Austin the Convention adjourned till 10 o’clock the following morning.

Third Session.

SEPTEMBER 20TH.

The meeting was called to order at 8 p.m., by the Chairman, Dr. VanBuskirk, calling upon the Secretary to read the Minutes of the previous Session.

The Committee appointed to examine and report upon Sanitary Apparatus, thereafter brought in their report.

The following is a copy of the report :—

To the Chairman and Members of the Sanitary Convention assembled at St. Thomas :

Your Committee appointed to Examine and Report upon Sanitary Apparatus, begs leave to report as follows :—

Your Committee has Examined the Earth Closets of the Earth Closet Co., No. 13, Jarvis Street, Toronto, and of Mr. John Cameron, No. 1, Victoria Street, Toronto, and is highly pleased with them. Their great advantage is their automatic action, which seemed to be very good in both.

Your Committee would take this opportunity of strongly urging the substitution of the so-called “dry-earth system” of disposing of excreta, instead of the use of privy-pits and cesspools now so common. The baneful results of allowing the soil to become saturated with the soilage of filth are being exposed in all directions. In the paper read before the Convention yesterday, by Dr. Ellis, and the discussion which followed it, one of these evils was pointed out, namely the danger of soilage into wells and cisterns. The pollution of the air by these pits is another fruitful source of disease.

Your Committee cannot, in this report, enter into a discussion of the relative merits and practicability of the dry and water systems of removal; but sanitarians are unanimous in condemning the pit system. All will agree that it ought to be done away with, and whilst very many consider the water system more practicable in large communities, all will agree in the absolute necessity of some form of dry-earth system in isolated communities, or in those communities where there is no proper sewage system nor proper sewage outfall.

Your Committee would draw the attention of the public, through you, to the remarks of Dr. W. B. Carpenter, in the letter read before you last night, as to the desirability of returning to the soil the material which has been drawn from it; this would be one of the most convenient and least offensive methods of so doing, the dry-earth system rendering such a process inodorous and inoffensive.

In households composed of adults the pail system, with a box of earth or ashes and a shovel in one corner, will answer as well as a more elaborate closet; but where there are young children, or in hotels or other places open to strangers, the advantages of a self-acting earth closet are very apparent. In both the closets under consideration the automatic action is very good and not liable to get out of order.

Your Committee has also examined the diagram of a patent trap styled an "Air Syphon Trap," by Mr. J. Caldwell, of Edinburgh, Scotland, and staying for a time at No. 75, Richmond Street, Toronto. This apparatus is cast in one piece, and consists of a water trap with two vent openings, one on the sewer side and one on the house side of it, and also has what is claimed as a protection against frost, and another protection against the entrance of rats from the sewer. The positions of the two vents are those recommended by sanitary authorities as efficacious in safely disposing of sewer gases, provided the openings communicate with tubes leading up to the roofs of dwellings, and do not open on or near the level of the ground as shown in the diagram. Your Committee can see no advantage in the division into two of the vent-tubes on the house side of the trap. The action must be supplemented by the continuation of the soil pipe through the roof as now endorsed by sanitarians, a counter opening and through current being thereby established.

Your Committee is of opinion that the rat protection, a grating with inch spaces, between the trap and sewer, will cause stoppage of the drain by interfering with the onward passage of house cloths and other contents of drains.

We have also grave doubts as to the efficiency of the frost protector, especially in our climate.

We would recommend that the seal of the trap should be deeper than that shown in the diagram.

Your Committee is informed that it was the intention of one of the leading plumbers of Toronto to send up a variety of sanitary apparatus, but that he was prevented by sickness, a circumstance which we much regret.

All of which is respectfully submitted.

WM. OLDRIGHT,
WM. C. VANBUSKIRK,
C. McLARTY.

In the discussion, which followed upon the reading of the reports, Mr. McLaughlin, registrar, thought that if municipalities secured a supply of dry earth it would go a good way toward the introduction of an excellent system. In dry-earth closets, however, he noticed that unless the earth was very dry there was a tendency in it to choke up.

Dr. Oldright remarked that sifted coal ashes were a good substitute for dry earth. The report was received, after which Dr. Coventry read the following paper on

"THE PREVENTION AND RESTRICTION OF CONTROLLABLE DISEASES."

MR. CHAIRMAN, LADIES AND GENTLEMEN,—Without attempting to place before you information of an original character I must content myself by asking your attention for a short time to the consideration of a few well recognized principles, and with pointing out how they can be practically applied in the prevention of Controllable Diseases.

Without stopping to discuss the various theories of the origin of these affections I assume them to be propagated through the agency of germs, and they cannot make their appearance in an individual without being conveyed to him, any more than a Canada thistle or a stalk of wheat would grow without their germ having first been sown or planted. These germs are imbued with various qualities, some possessing great vitality, retaining life through a long range of temperature; some of them last much longer than others; some of them have the power to convey themselves a considerable

distance, and all of them are no doubt subject to the law of natural selection, which seems to guide them to the very spot where they can best reproduce themselves. One more factor and I will leave the theoretical part of the subject. To have a good crop of everything the ground must be cultivated. The cultivated ground for contagious diseases is one where filth abounds, where the drinking water is foul, the sewerage bad, and where the food, clothing and temperature are so mismanaged as to debilitate the individual.

The following diseases are to a very large extent preventable, and call for our first and our earnest attention; and the first case of any of them is the point at which they can be most easily controlled. Cholera, Yellow Fever, Typhus Fever, Typhoid Fever, Scarlet Fever, Smallpox, Diphtheria, Measles and Whooping-cough are the maladies which carry off by far the greatest number. We have been in the habit of allowing them a good foothold, and then giving them battle. Why not declare war against them on our shores on their first advent, and maintain an army in the shape of organized Boards of Health, in every municipality, furnished with a knowledge of the enemy's mode of attack, and armed with such weapons as will capture and route the invader? The people of Ontario may safely be congratulated on the advent of such a movement. These diseases may all be circumvented by isolation and disinfection, the success of which will largely depend on the thoroughness with which the details are carried out. Cholera is the first-mentioned malady. This affection is one of the most difficult to manage. The germs are possessed of great power of locomotion, and are intensely subtle. If not arrested at quarantine it cannot be successfully isolated at ordinary distances.

Yellow Fever is in many of its habits similar to Cholera, though in this latitude we have little to fear from it.

Typhus we rarely see, and, like the last two, with a properly executed quarantine it should never appear in our midst.

Typhoid is only contagious to a slight degree, and if the principles of isolation and disinfection are intelligently applied where it exists, but little trouble will ensue. This pre-supposes the discovery and removal of the introducing cause.

With the restriction of Scarlet Fever we have had some practical experience in Windsor during the present year. It made its appearance in November last, and by the time the Board of Health was fortified with such legislation as would enable it to grapple with the disease, it had made considerable headway. To begin with, physicians were required to report all cases within twenty-four hours after their discovery. The house was at once placarded with the name of the disease. Where such arrangement could be made, one large room was selected as the "Hospital," and carpets, window hangings and upholstered furniture removed. One member of the family after another, as they were attacked, were taken to it, and kept there till all exfoliation of the skin had taken place. No members of the family were allowed to leave the premises except those who did not come in contact with infected members. Neighbours were prevented from going and coming at will. Where the family could not attend to the sick without help, nurses were procured and printed instructions were given to guide them in the hygienic management of the patient, due deference being always paid to the medical attendants' directions. After recovery and exfoliation, strong sulphurous acid soap was used to wash with. All clothing that could not be put in boiling water was hung up in a close room, and the following disinfectant used: Sulphur, twelve ounces; Potas Nitras, two ounces; Camphor, two drams. This was placed in an old iron pot and a match applied. It burns slowly, and evolves sulphurous acid gas. No form of either animal or vegetable life will survive such a process if properly carried out. In cases of death no public funeral was permitted, and interment was urged without delay. The hearse and carriage conveying pall-bearers and friends were immediately disinfected. During part of the epidemic the schools were closed, and after they opened no member of an infected family was admitted to school within thirty days after the medical attendant certified the family was free from disease. To the credit be it said of nearly all parties having the misfortune of being inflicted with the disease, not only did they offer no objection to the regulations of the Board of Health, but instead they lent all their energies to coöperate with the Board.

Employers of labour greatly aided our efforts by refusing to allow parties from infected houses who had no certificate to work, or come in contact with, children or young people.

The advent of Smallpox to the town in the month of April proved to be a severe trial, not only to the authority of the Board of Health, but it was also at once disagreeable, arduous and at times perplexing. The malady made its first appearance in a boarding house where the father and youngest child broke out simultaneously, neither of whom had previously been vaccinated. An effort was made to disinfect the boarders' clothing, but they fled with their trunks before they could be got at, leaving only the family in the house. An attempt to remove them to the pest house was resisted, and violence threatened. Owing to a misapprehension of the powers vested in the Police Magistrate the attempt to remove the patients was abandoned, and only those not infected were sent to the pest house, a building which had not been used for three years. No new cases developed till twelve days from the death of the keeper of the boarding house, but as the case was a confluent one and situated in a populous district, infection was carried by the prevailing winds to half a dozen families, all living in a direct line, but in different streets, having no direct communication either with one another or the infected house. Nearly all the new cases were promptly removed, either to the pest house or to other isolated buildings vacated for the purpose. Only two families defied all efforts of the Board to remove them. In one the patient recovered, and after a death took place in the other, they were not only willing, but anxious to be removed. Twelve days again after this death marked another outbreak, but all were now promptly removed 500 feet from other habitations, and the disease came as suddenly to a close as did the war in Egypt.

Similar precautions were adopted as in the case of Scarlet Fever; all members of the family re-vaccinated, and all who had been in contact with them, and a close watch kept up for the next fifteen days. Thorough disinfection was practised under the direction and with the help of a trained assistant. The schools were again closed and public vaccinators appointed to vaccinate all children applying, and none were admitted to school without a certificate. None but cities have the power to pass compulsory vaccination laws. This power under the approval of the Provincial Board will undoubtedly be extended to all municipalities. Isolation, vaccination and disinfection are the remedies for this disease. In proportion to the completeness of the application of these safeguards will it be speedily arrested. Would to God we possessed the knowledge of circumventing other diseases so easily.

Diphtheria we also placarded, isolated and disinfected, the same as Scarlet Fever. The other diseases mentioned, when the public are thoroughly aroused to the necessity of stamping them out, will be dealt with in a similar manner.

By way of summary then let me say that Cholera and Yellow Fever are only successfully isolated and controlled at quarantine, or at such a distance as is not yet fully determined, but perhaps at least 2,000 feet will be found necessary. Typhus, or ship fever, should also be arrested at quarantine. Not that it is contagious at great distances, but its existence on a vessel should call for thorough disinfection.

Typhoid, Scarlet Fever and Diphtheria may with great vigilance be restricted to the point where they first make their appearance, just as a fire may be confined to the house it breaks out in, if the Fire Brigade does its duty. Isolation and disinfection are the forces at our command, but we must use them without omitting the most minute precaution. Smallpox if discovered early need not spread beyond the first case, but in order to confine it to this limit the patient, provided with a competent nurse, should be removed 500 feet from the nearest habitation. The same process of disinfection is all that could be desired. Vaccination and re-vaccination with Cow-pox will complete the process of repression. Measles, Whooping-cough, Mumps, Chicken-pox and many other diseases will yield to the same precaution.

The public mind should not be lulled to repose by trusting to such disinfectants as chloride of lime, impregnation of the atmosphere by carbolic acid, assafoetida, the camphor bag or an amulet, but should be taught that disease germs are almost indestructible and that only the fumes of sulphurous acid or chlorine gas will accomplish their destruction. Medical men must in this matter be the educators of the public, and the true physician will allow no opportunity to pass without instructing the head of every house-

hold, intrusted with the lives of little folk, how he shall best guard his door against the "grim monster."

The whole community is startled by the news of a railroad accident, or a murder, or when a few lives are lost, but a lethargy is upon them which keeps their hands folded when an epidemic is deliberately propagated among themselves, by themselves, when dozens of happy households are quickly transformed into dreary habitations.

In order to cope successfully with contagious diseases, much has yet to be done. The public must be thoroughly aroused to a sense of its duty. The matter must be urged on everyone, and information must be systematically diffused. The seeming hardships in the discipline to which people are subjected must be argued and explained, but the life-saving work must be carried on at all hazards. Legislative enactments have to be placed upon the statute book that will bring the whole community under the same uniform legislation. For one municipality to placard infectious diseases while another conceals them, is obviously unfair to the mercantile interests of the former, and from a sanitary point of view, but little can be effected without combined action.

A quarantine on the Atlantic and other borders of the country, having a real and not a paper existence, must be established and maintained.

Parenthetically allow me to remark that Smallpox was brought to Windsor by an English emigrant, a passenger on the steamer *Peruvian*, which had Smallpox on board when she arrived in Halifax on February last. The vessel was detained at quarantine, but when night came the captain weighed anchor, came alongside the wharf, paid his fine of \$500, and discharged his passengers and cargo, scattering the scourge throughout the Dominion and many States of the Union.

It would seem a sensible thing to do to replace the fairy tales, the allegories, the algebra, and much of the classics taught in our schools with books containing the principles and laws of health. It would give a bent to the mind of the rising generation which might stimulate research in a field of thought, which, even though it has been tilled by able men, able physicians, is still barren to what it might be, if one of the chief studies of mankind was to attain to physical as well as moral excellence; to know what is the best to breathe, and how to breathe it; what is best to eat, and how to eat it; how to be clothed and housed; how to seek health and to shun disease; how to conform to Nature's laws relating to man's existence; how to live to a good old age and to pass away from natural decay, having suffered only a minimum of pain.

The great aim and purpose of nearly all legislation has been to enrich the country, and large sums are annually put in the estimates for the purpose, but let us hope that the time will soon come when a Minister with a portfolio of Public Health will take rank among the other members of the General Government, and such appropriations made as will place it within the range of possibilities to secure the services of the most intelligent men in the land, through whose efforts contagious diseases and the mortality caused by them may be reduced to a mere fraction.

It is due to you gentlemen, and only justice to myself, to apologize for this somewhat incoherent paper. I have written it hurriedly and have not had time to revise it. It will serve the purpose of an introduction to the discussion of the subject. I will be happy to describe details and fully explain matters that are only vaguely referred to.

Dr. Coventry's concise and practical paper was greeted with loud applause. In the discussion which followed, Dr. Oldright, commenting on the paper, remarked that anyone who would conceal contagious disease in his house, thus running the danger of spreading it throughout the municipality, for the purpose of making money, should be scouted by the community. The desirability of placarding infected houses and using necessary means for preventing the spread of contagious diseases, was, he thought, very apparent.

In answer to a question, Dr. Oldright said the duties of the Provincial Board were merely advisory. Before sitting down he bore testimony to the efficient and laborious work performed by Dr. Coventry and his *confrères* when smallpox broke out in the town of Windsor last spring.

Mr. McDougall strongly endorsed the methods used at Windsor, to prevent the

spread of Scarlet Fever and Smallpox, as commending themselves to the common sense of all. He further moved the following resolution, which was carried:—"This Convention has heard with much gratification Dr. Coventry's account of the success which has attended the adoption, in the town of Windsor, of measures for arresting the spread of Scarlet Fever, Diphtheria, and other contagious diseases, and would urge upon other municipalities the adoption of similar measures, such as prompt isolation in their own houses, or in hospitals, of all cases of these diseases which at present make such havoc among our people."

Dr. Bryce referred especially to Diphtheria and Scarlet Fever. These, he remarked, were not apparently so dangerous to life as Smallpox, but in reality they created much more havoc. Measles also caused much mortality, as but little attention was too often paid to the disease. In many of these affections it is difficult to know their true nature for twenty-four hours or more, which time is sufficient for communicating the contagion to others. Hence, in doubtful cases parents should at once apply to their family physician to have the nature of the disease diagnosed. This was most desirable inasmuch as the danger from these diseases is due to their not appearing at first so alarming as Smallpox.

Dr. Coventry remarked, to show how little Smallpox was to be dreaded, that in Windsor out of forty cases ten had not been vaccinated and out of these eight died. Thirty were vaccinated, of whom none died.

A cordial vote of thanks was tendered to Dr. Coventry for his paper.

Dr. VanBuskirk, Mayor of St. Thomas, then addressed the Convention on the subject of

"SEWERAGE AS A SANITARY MEASURE."*

"There are," he said, "three modes of disposing of sewage: First, the old method—the cesspool that receives all the filth from the house, and gives rise to noisome effluvia, thus poisoning the atmosphere, while owing to the imperfect condition of the walls the excreta pass through the porous and stratified earth into neighbouring wells, the transmission being made rapidly in consequence of gravitation, the cesspools being frequently filled and the wells pumped out. Under the microscope water containing sewage discloses the presence of *bacteria* and *infusoria*, the frequent cause of bowel complaint, Typhoid and kindred diseases. The second method of disposing of sewage, that of dry-earth closets, is best for suburban parts of cities, but not adapted to thickly-populated districts. They must accept the water-closet as the best of all systems. The small sewer pipe drain laid on each side of the street for house sewage, he did not consider had any advantage over the common sewer of brick and tile. Ventilating tubes fixed to the soil pipes outside would freely ventilate the sewer."

Dr. Coventry said that if a sewer were constructed in the shape of an egg then it could be kept perfectly clean. Proper levels and a sufficient fall to carry off impurities should be carefully attended to, and the want of this he believed to be the bane of the system in Toronto. Earth closets, if properly attended to, were good, he thought, but they were more often neglected.

Dr. Oldright advocated the carrying of sewer gas above the roofs of houses by pipes run up from the house drains, instead of allowing it to force its way into houses or escape on the surface of the street.

Dr. VanBuskirk rather took an opposite view, and thought the gas could best escape through the gratings in the centre of the street.

Dr. Oldright said that sewer gases, and even carbonic acid, would rise if of much higher temperature than the outside air. If too heavy to rise, let them remain in the sewers—they could do no harm there; but if they rose, or from various causes were forced, out of the sewers, it would be better for them to be discharged at a safe point overhead, rather than at the feet of persons in the streets, to be by them inhaled.

Some discussion arose as to the local system of sewerage, St. Thomas being at present agitated by the question of the best means of getting rid of sewage, after which the subject dropped.

* The Secretary has unfortunately been unable to get the full text of the paper.

Dr. J. J. Cassidy, of Toronto, next read a paper on

"THE HEATING AND VENTILATION OF BUILDINGS."

MR. CHAIRMAN, LADIES AND GENTLEMEN,—Last spring I had the pleasure of listening to a lecture by Oscar Wilde on the external and internal ornamentation of houses. The lecture was entitled "The House Beautiful," and the lecturer concerned himself principally with the beauty of form and colour. It is true that, as Keats says or sings, "a thing of beauty is a joy forever," and well-coloured walls, beautifully-tinted glass, the charm of carved wood, the elegant mantel with its precious freight of ornamented tiles or plaques, are not only beautiful in themselves, but excite corresponding ideas in the mind of the beholder. Much said by the lecturer has point in reference to Ontario, and a rich crop of architectural improvements may be reasonably expected from the æsthetic seed sown last spring. It shall be my endeavour in the course of this paper to add to the picture of "The House Beautiful," to give it, not the warmth of colour, but the real glow of heat, and to show how that heated air may be so managed as to warm and yet not injure those who breathe it.

During the summer months ventilation is obligatory, and is efficiently carried out. We then have cheapness, efficient heating, and satisfactory ventilation. During winter we cannot have these three things together. We can have any two of them together, as for instance cheapness and efficient heating, cheapness and efficient ventilation; but if we wish to provide simultaneously efficient heating and ventilation for "The House Beautiful," then we must cast aside cheapness and burn fuel freely. Dr. Billings, United States army, says, "The object of perfect ventilation being an arrangement by which no man shall breathe any air that has immediately before been inside his lungs or those of his neighbour, it follows that the air must move either directly up or down. Horizontal currents then cannot be used to secure perfect ventilation. Wherever they are used you secure only a mixing process, or ventilation by dilution. In the hall of the House of Representatives, at Washington, an attempt has been made to secure perfect ventilation. The air is introduced all over the floor, and passes straight up and out at the ceiling. In order to secure the proper proportions, it requires about one cubic foot of air per second to each person. That only gives a rising current of about half an inch per second. If the air had to be drawn downwards, we should have to use a great deal more; because we should have to overcome the natural tendency of the heated air to rise, for every person on the floor is a little stove, warming the air around him; and with a delicate air meter you can detect at a temperature of 50° a current of air over his head. We should also have difficulties with the gas jets, because we should be drawing the heated and impure air from them downwards." A suitable system of ventilation for churches and public halls must therefore be necessarily an expensive one. And yet by the adoption of certain methods intelligently applied, much may be done to secure the boon of pure warm air in your houses at a small cost.

It is supposed, in the first place, that the house and its surroundings are perfectly clean. Pure air is often spoiled ere it reaches our lungs by the emanations from foul stables, dirty yards, etc. In the second place it is necessary that every room in the house should be furnished with a fireplace, grate, or an open flue communicating with a heated chimney. These flues should be made to open at the base-line of the room, and communicate directly with the open air. Occasionally ventilators are placed at the ceilings of rooms; but this is an expensive method, as the heated air which may be quite pure on entering the room, ascends to the ceiling and escapes readily, obliging the occupants to burn a very large quantity of fuel, if they wish to keep the room at a comfortable temperature.

When hot water or steam is used in heating a house, the ventilating flues should be heated by a few coils of pipe in connection with the general heating system. Even in summer, when a number of persons occupy a room simultaneously, or when a case of sickness is being treated therein, the ventilation may be much improved by keeping a gas-jet or a coal-oil lamp burning under the grate or ventilating flue.

In the third place, a sufficient supply of pure warm air must be distributed to the various living rooms, and this may be accomplished in a variety of ways, according to the different methods of heating adopted.

In the Report of the State Board of Health for Michigan for 1880, I find a short paper on a mode of ventilating a room heated by a coal stove, which is worthy of being more generally known and adopted. The paper is from the pen of the Rev. D. C. Jacokes, a gentleman who has devoted much time and study to the subject of ventilation, combined with heating. The diagram, which I now exhibit, will illustrate the writer's idea.

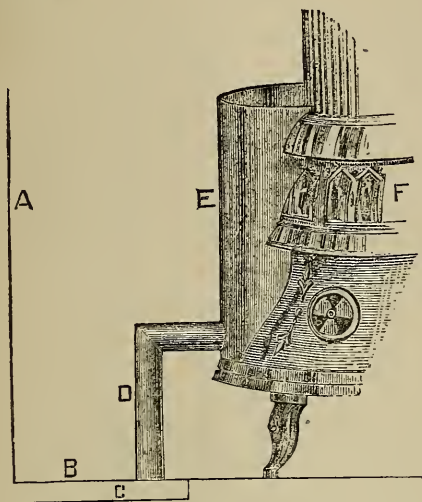


Fig. 1.

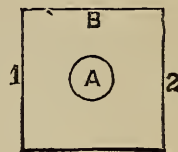


Fig. 2.

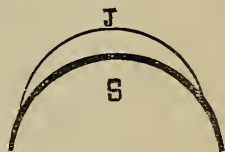


Fig. 3.

Fig. 1.—*A*, wall of room; *B*, floor; *C*, box to convey outdoor air against the stove; *D*, stove-pipe six inches diameter, fastened to jacket *E*; *E*, sheet iron jacket 16 inches wide, 18 or 20 inches high, between which and the stove the air is heated, and passes into the room; *F*, *F*, stove.

Fig. 2 shows the jacket of sheet iron, with the pipe fastened to it at *A*. The sides 1 and 2 are bent rounding so as to closely fit the side of the stove.

Fig. 3.—*J*, jacket; *S*, stove.

The ventilation is obtained by a four-inch stove pipe, opened at the bottom, taking the air from the floor and connected with the chimney. By means of this pipe the heated chimney carries the foul air from the room out of doors. Dr. Baker, of Lansing, who uses this method of ventilation in his house, considers it both cheap and satisfactory. I take all the more pleasure in bringing it to your notice, because it must be quite clear that the majority of the people of this country must always continue to heat their houses by stoves. On the score of beauty, it might be desirable to adopt some other system, for even the least æsthetic must admit that a stove is not "a thing of beauty;" but in this cold climate a grate fire, though pretty to look at and an excellent ventilator, is a poor heater, requires a good deal of attendance, and at best is only suited for small rooms.

When heating by hot-air is adopted, whether by stove or furnace, it is of course necessary to see that the inlet and delivery pipes are kept clean. In order to prevent the entry of dust and irritating particles into the rooms, it would be well to have a fine wire screen over the outer and inner orifices of the inlet pipe.

In large buildings, public or private, where heating by steam or hot-water is adopted, the same principle of efficient supply and exhaust must be rigidly observed. As an instance of how the heating and ventilation of public buildings may be changed, so as to render the process more economical and more efficient, I shall quote from the Report of the Committee on Ventilation of the Detroit House of Correction. "The old method of heating consisted in distributing along the lateral walls of the corridors coils of one and a-quarter inch steam pipes, furnishing fresh air beneath these by a number of small circular openings distributed equidistant beneath these coils, and just

above the surface of the outside earth, with exhaust of foul air through round latticed openings in the ceilings, and a vacant space beneath the roof with little provision for escape therefrom, and that mainly through imperfect joints between the roof and the walls. Of course the only method of warming then in vogue was 'direct radiation.' The present Superintendent has extended ventilating shafts from behind the several cells to and through the roof in some instances, and in others utilized old neglected flues or shafts, by placing within them gas-jets to rarify the contained air, and thus induce an inflow below and a continuous exhaustion. This supplies the needed exhaustion, while beneath and in front of a large window on either side of said corridor are placed boxes, made to fit the windows closely, containing an abundant steam coil, and so arranged that on opening the lower sash of the window, the fresh air is permitted to flow down behind an intervening screen and beneath this steam coil, and thence up through said coil to be discharged by a well regulated opening at the top. This is the 'indirect system of radiation,' by which a goodly supply of not only fresh but warmed air is supplied, fully under the control of the person in charge. This, to your Committee seems eminently practical and economical as well. The conditions of supply and exhaust have both received their proper attention, which conditions, either the one or the other, in our judgment are too often overlooked."

As a corroboration of the finding of this committee, I may remark that during the winter months, in the Toronto General Hospital, in the older portion of the building, the inlet of pure air is obtained by a somewhat similar device. The lower sash of a window in the ward is raised, thus allowing pure air to flow in over a steam radiator. Thus even in the coldest days, pure warmed air may be allowed to flow into wards even where cases of acute lung disease are being treated. The method pursued at the Detroit House of Correction seems less likely to cause draughts. In Toronto General Hospital, the exhaust is obtained by utilizing old flues and fireplaces; in some instances a lamp being kept burning under a stove pipe elbow, which is inserted into a chimney flue. It must be confessed, however, that a more efficient system of exhaust would be to provide four flues, each containing a coil of steam pipe for each ward. These flues could for convenience be grouped in a central column, passing from flat to flat and terminating in screened outlets at the roof.

The ventilation of the more modern portions of Toronto General Hospital is furnished by the Reynolds system, which gives general satisfaction in its practical working, and reposes moreover on a sound scientific basis. The exhaust is obtained by a central shaft passing from the basement through the roof and terminating in an ornamental chimney top. This shaft contains a central iron tube, used as a flue for the furnace in the basement which heats the baths. The heat from this constant current of hot air and smoke passing through the iron tube intensifies the upward draught in the shaft. Each and every room is connected with this shaft by ventilating tubes, opening at the base line of the room. In winter, with the doors and windows closed, pure warm air is introduced after the following manner: The outside air, conducted by a large tube, passes over a dome in the basement heated by a furnace, whence it is distributed to the various rooms by tubes opening in the walls, about three or four feet from the ceiling. The supply of pure warm air is abundant; but lest the air should at any time become too hot, pure cold air can be admitted to any room by opening a tube in connection with the outer air, thus reducing the temperature of the room without creating unnecessary draught. This system is really an admirable one. The exhaust is constant and complete both in winter and summer, and the supply of pure air is completely under the control of the person in charge. When necessary the hot air supply can be cut off from any particular room in the building, the windows opened, and the most thorough ventilation practised. Having been connected with Toronto General Hospital for thirteen years, both under the old system of ventilation and the new, I can speak with confidence of the great improvement in the atmosphere of the older building. Formerly, more particularly in the surgical wards, the odours used to be quite overpowering, and it was difficult to imagine that patients who breathed such an atmosphere day after day could derive any substantial benefit from the best directed treatment. Now, on the contrary, it is pleasing to be able to state that visitors fresh from the outside air discover no disagreeable odours in passing through the wards.

Whichever method be adopted it must be clearly understood that all soil pipes, closets, lavatories, drains, etc., should be provided with independent ventilation by pipes extending beyond the roof. I have introduced the words "independent ventilation," because I consider it safer that foul pipes and drains should be ventilated directly into the open air, rather than into house flues or chimneys. In damp weather, if the flue is not heated, at night when it grows cold, or accidentally owing to choking of the flue, a downward current may proceed from it, introducing poisonous gases into our dwellings. Wherever artificial warming and ventilation, such as I have been describing, are in use it is necessary that the conditions upon which pure warm air is supplied and foul air removed should be clearly understood. It sometimes happens that a system of ventilation which is excellent in itself is condemned because through carelessness or inattention some important factor in the problem is misunderstood or overlooked. I shall illustrate these remarks by an experiment which I witnessed in the office of the State Board of Health in the Capitol at Lansing. The room was heated by hot air up to 68° F., entering by a register on one side of the room, the door and window being closed, the exhaust of foul air was supplied by a flue on the opposite side of the room opening at the base. This exhaust worked satisfactorily, as the flame from a piece of lighted paper mounted with the current. On opening the fanlight over the door, the current in the exhaust was reversed, and the foul air re-entered the room. The explanation I offer of this fact is as follows: as long as the warm air, which entered the room, found no other exit than the ventilating flue it naturally followed that route; but when a new ventilator was opened over the door, the heated air ascending escaped by that opening into the corridor. An upward warm current was thus established through the fanlight, and a downward cool converging current in the ventilating flue.

A question of considerable practical interest in connection with the warming of our houses is the supply of a proper proportion of moisture with the heat. It will not be disputed, says Mr. Jno. K. Allen, of Lansing, that moist air at 68° F. is more enjoyable and better fitted to sustain life than dry air at 80°. Yet in cold weather, with the thermometer below zero, while every heating apparatus is forced to its greatest capacity, we are obliged to breathe a parched air which dries the throat and irritates the air passages, and with it the sulphurous and carbonic gases which are thrown off from the coal, and produced through the overheating of the iron. Besides, it must be remembered that for every degree the air is warmed under ordinary heating conditions its vitalizing force is diminished, and the amount of moisture that needs to be added to make it agreeable is increased. Water may be employed in a twofold capacity to overcome these difficulties. In the first place, it serves to absorb impurities which may be present in the air, and, in the second place, it lends its own moisture to the heated air and renders it more agreeable to breathe. Water may be evaporated in pans of various styles and sizes, or it may be placed in a section of the pipe which conducts the hot air from the cellar to the rooms above. It must be remembered on the other hand, that the more air is heated, the more its capacity for absorbing moisture is increased, and that if large quantities of water are thus evaporated they will afterwards be precipitated and will lodge on windows, walls and other objects in the room. Water pans are also frequently allowed to go empty, or in place of containing pure fresh water put in every few hours, they will frequently be found to contain dirty water, mixed with dust, ashes, rust, etc. Air moistening, therefore, unless carefully attended to is not an unmixed blessing, but with ordinary precautions as to the cleanness of the vessel used and the freshness of the water evaporated we may safely conclude that air moistening not only renders the air more agreeable to breathe, but is also calculated to ward off or to mitigate diseases of the air passages, such as Bronchitis, Pneumonia, Diphtheria, etc.

While strict attention should be paid to the ventilation of every room in the house, it seems clear that the proper ventilation of our cellars should be of the first importance. In winter cellars are closed up as tightly as possible. They are often not drained, and, in addition, decaying vegetable matter adds its poisonous store to the currents of air, which are constantly mounting to the rooms above. If cellars of dwellings are apt to be in this condition, what must be the condition of the basements in stores, factories, theatres, and other public buildings? In summer, should the air of the cellar be offensive, we open the windows and remove the rubbish. In winter we fancy that the air is

pure enough as long as it is cold enough. The same system of ventilation by flues, which has been recommended for the living rooms, applies equally well to the cellar. A vegetable cellar should be connected with the nearest chimney by means of an eight inch stove pipe, and no vegetable cellar should be under a dwelling unless the cellar is well ventilated.

Frequently in reading articles on impure air, one is impressed with the extraordinary importance attached to the poisonous qualities inherent in carbonic acid. In Fownes' work on chemistry we find it stated at page 147, "Carbonic acid is very hurtful to life, even when largely diluted with air; it acts as a narcotic poison. Hence the danger arising from imperfect ventilation, the use of fireplaces and stoves of all kinds unprovided with proper chimneys, and the crowding together of many individuals in houses and ships without efficient means of renewing the air; for carbonic acid is constantly disengaged during the process of breathing, which is nothing but a process of slow combustion. This gas is colourless; it has an agreeable pungent taste and odour, but cannot be breathed for a minute without insensibility following." The specific gravity is 1.524, 100 cubic inches weighing 47.26 grains. An equal quantity of atmospheric air weighs 31.0117 grains. Unfortunately, however, for the house-dweller carbonic acid is not the only impurity of the air with which he has to wrestle; impurities of a more complex nature, escaping from the clothing, lungs and skin of those with whom he is brought in contact, must be added to the sum. These impurities are dangerous to health, but they are difficult of detection. So that the detection of any undue quantity of carbonic acid in the atmosphere of a room may be taken as an indication that other more important impurities are also present. Fortunately for man, the Great Creator, in permitting this deadly gas to issue from the lungs of breathing creatures, has endowed it with a power of diffusion, which prevents it from exercising its poisonous power. If it were not for the existence of this law of the diffusibility of gases, carbonic acid, which is much heavier than air, would, by sinking to the lower levels of the earth's surface, have long since brought about the extinction of species. But on the contrary, after leaving our lungs it rapidly diffuses itself through the air of the room, being present in the air at the ceiling just as abundantly as in that next the floor. It would seem, therefore, from these considerations, that the more civilized we become the more intricate are the problems which are submitted in connection with our health and welfare. The log shanty of the early settler offered fewer difficulties in the way of efficient ventilation than the more pretentious brick dwelling, which shelters his declining years; but his children must see to it that the "house beautiful" is not deprived of pure air and converted into an air-tight box, instead of a dwelling fit for human beings. By looking closely into this matter, and putting your good resolutions into practice, you will not only contribute to the health and longevity of your families, but you will do much to prove to the incredulous that, even in this northern region, it is possible to live comfortably and yet healthfully; to breathe pure air and yet to have it properly warmed; and even when the landscape is dark and chill you may, by a not too violent stretch of the imagination, fancy that you are rejoicing in the pure warm air of summer.

Dr. Yeomans, referring to Dr. Cassidy's paper, said that Consumption is essentially a disease of indoor life, and was the largest cause of death in Ontario last year. Great attention should therefore be paid to house ventilation, and Dr. Cassidy's paper he hoped would be printed and widely read.

Mr. Miller regretted that the majority of our schools were built almost entirely without any regard to ventilation.

Some considerable discussion on the subject ensued, and a vote of thanks was passed to Dr. Cassidy for his able and carefully prepared address.

On motion of Dr. Oldright, thanks were conveyed to the County Council for the use of the Court House, to Mayor VanBuskirk for presiding, and the railway companies for reduced rates.

The Convention then finally adjourned.

PETER H. BRYCE,
Secretary.

ARTICLE III.

TYPHOID AND SOME OTHER ZYMOTIC DISEASES, THEIR CAUSES AND PREVENTION.

BY DR. P. H. BRYCE, M.A.

*(A Lecture Delivered under the Auspices of the Mechanics' Institute of Galt,
October 10th, 1882.)*

MR. CHAIRMAN, LADIES AND GENTLEMEN,—In appearing before you to-night, in the capacity of a lecturer on Public Health, it may be deemed proper that I should explain how and why I appear in this capacity. Having been appointed under the terms of the Public Health Act of 1882, Chief Health Officer of the Province, I have conceived that one part at least of my duties should be to, as far as in my circumstances and with my ability may be possible, bring before the general public, in what ways be deemed best, certain facts concerning the causation of what we may call Preventible diseases, and endeavour to induce the individual public to take such means as may best tend to prevent them.

To this end, having made a proposal to your Institute to address a Public Meeting on some subject relating to the Public Health, it was cordially agreed to that I should appear before you under its auspices to-night. I can only say in the outset that I do not intend to be the apostle of any new creed, to introduce scientific theories as yet not promulgated, nor in any way seem to usurp any medical rights which my professional friends may have; but rather I shall endeavour to build upon well-laid foundations, to strengthen the hands of your medical gentlemen in their Samaritan work of mercy, and to encourage the public to arouse themselves to action in combatting by methods alone possible to them the advance of those epidemic diseases, which, since history began, have proved themselves to be more fatal than volcanic outburst, destructive avalanche or the awful carnage of internecine strife.

Understanding that the health of your town has been suffering of late from the presence of serious forms of fever, I shall speak more particularly of "The causes of Typhoid Fever;" but may, if time permit, say something as to some other Zymotic diseases often prevalent in our communities. Still I hope it will be understood that most of the following remarks will hold good for the various other Zymotic diseases in common with Typhoid.

The advance made by Science in the accurate location of the causes of many diseases has in the last twenty years, through the perfecting of chemical processes and microscopic methods and the accurate and extended study of meteorological conditions, been simply marvellous. What suspicions the pondering of many facts gave to the careful physician of forty years ago, have become confirmed principles to be acted upon by the scientist of to-day. In no field, however, have there been more obstacles to overcome, and in none have there been so many or more earnest workers, than in that of the difficult problems of the causation of disease. But on the scientific mind, which, like a photographic plate, has been gradually cleansed by the effort to think rightly, impressions of the truth and the correct comprehension of facts are gradually appearing.

Causation of Zymotic Diseases.—To this problem, then, let us first address ourselves. The term *Zymotic*, which is the term now commonly applied to what may become epidemic diseases, may be defined as being derived from a Greek word *zyme* meaning *ferment*, a word which is now, however, looked upon as synonymous with the word *germ*, which means, as commonly understood, the basis from which anything is developed. These terms, however, are such as might serve as a scientific way of expressing any cause however indefinitely understood. But our scientific workers could never have been satisfied with such indefiniteness, and it is through the united labours of many that upon the world of

the invisible light has been shed. Let me illustrate in the simplest way possible what is meant by the scientific word *zyme* or *germ*.

All know well that what is called *yeast* is a something which has the property of exciting fermentation in any substance containing sugar. But probably our most capable housewife would be unable to inform us of more than the fact. She would know little of the *how* and the *why*.

But as the *how* and *why* have the greatest possible importance in the question we are to consider to-night, I shall try and tell you something of the "how and why."

Take some yeast and strain it through a coarse filter and it appears as a brownish fluid without any solid particles. But add some of it to a clear solution of sugar, keeping this warm, and soon the mixture becomes frothy and begins to give off bubbles of gas. It gradually loses its sweetness, gets an alcoholic flavour and intoxicating qualities, and supplies a fluid which burns. Dry this fluid and it yields a powder which, if kept dry, retains the power of producing fermentation for a long time. Heat, however, the yeast up to boiling point before adding it to the sugar solution and no fermentation follows. The boiling has destroyed the powers of the yeast. Sugar will not ferment without yeast, and if it does without yeast being added then some air containing yeast particles has come in contact with it. Singular as it may seem, if we filter air through wool and let it come in contact with the solution the latter will not ferment.

- (1) We thus see that in yeast there is a something which provokes fermentation.
- (2) That the something has its power destroyed at a high temperature.
- (3) That this something consists of particles which can be filtered out of the fluid.
- (4) That they may be in air and may be filtered out by its being passed through wool.

Now, a drop of yeast under the microscope will tell us what these articles are. Even a hand-lens shows particles like sand in the fluid; while a magnifying power of 500 diameters reveals their true character. Each little particle called a *Torula* is seen to be a round transparent body from $\frac{1}{800}$ to $\frac{1}{700}$ of an inch in diameter. Each is a little round sac with a semi-fluid matter inside, and if the sac burst little granules diffuse themselves through the fluid.

Strange as it may seem, each of the little granules inside, if in the warm sugar solution, will grow into a sac like the first; and, as already remarked, the clear sugar solution will soon become turbid. We thus see that the yeast has grown, and when a mass of it is burned and analyzed it is found to be composed of materials similar to those in *white of egg*.

Now since this minute particle has grown and has used up a considerable amount of the sugar solution, has produced alcohol and bubbles of carbonic acid gas, it is evident that it must have grown by feeding upon the solution of sugar. If then these little sacs or cells absorb the constituents of the sugar solution and change them chemically it must be because they are living bodies. Hence that the particle is alive, and proved by its cell-wall, composed of cellulose, to be a plant, and to be capable of absorbing these materials for its growth, utilizing the oxygen and giving off carbonic acid, seems evident.

I have detailed, ladies and gentlemen, the *why* and *how* of a process you all know something about as a *result*; and I have done so, in order if possible, to make plain to you the process of action which is carried on by minute cells, such as the *Torula* or yeast-plant, and which, developing in infinite quantities from a single particle, may in the best sense be called a germ or *zyme*. I have stated this view since it has now become fashionable to say that *germs*, *bacteria* or *microbes* have caused this or that disease in the way that I have already shown you. Of such germs there are various species diffused through the air and wafted often long distances; some flourishing at one temperature, some at another; some feeding on animal and some on vegetable matter; some upon solid matter, some on air alone; some needing light, some darkness; while many are constantly diffused in air ready to multiply a million-fold whenever circumstances may be favourable. Beale remarks that the various germs of vegetable origin, which it is supposed give rise to disease with various characteristics, are present in the blood; and he further remarks that in the primitive stage these have no distinct characteristics by which they may be distinguished, and whatever differences they may have in the developed state there are none perceptible in the embryonic condition.

Thus then we have illustrated the life and qualities of a germ, and I trust all have

been able to understand the steps as we have proceeded. But as we would naturally suppose there are various species of these fungi and other microscopic plants, growing and multiplying under different atmospheric conditions, different degrees of heat, in different fluids and substances, some in light and some in darkness.

Thus we have *Protococcus plurialis* in old eave-troughs, water tanks, shallow pools, etc.; *Pencicillium glaucum*, familiar as the mould on bread, jam, old boots, etc.; *Mucor mucedo* on manure heaps, etc.; *Aspergillus* on certain unhealthy epidermis, etc. Another class of low organisms, however, which from their shape have been named Bacteria and which usually are of exceeding minuteness ($\frac{1}{10000}$ to $\frac{1}{30000}$ of an inch in diameter), is that wherein have been placed most of the germs, which according to many are the seeds of our various epidemic diseases, such as Smallpox, Diphtheria, Typhoid, Cholera, etc.

Now, I trust that my previous remarks will have brought us to a point where all will see that it is quite reasonable to suppose that as *Torula* grows in sugar solution—*Protococcus* in moist earth mould, and as *Mycoderma Aceti* seems to produce vinegar, so there may be other germs, call them as you please, Bacteria, Bacilli, etc., which grow in various fluids, some in the blood of animals, some in the blood of man, some in saliva, some in the fluids of the stomach, intestines, etc.; and that of necessity—since for their growth they feed upon the fluids they are situated in—these fluids must be altered in quality to a greater or less extent and thus produce, we may fairly infer, the phenomena of various diseases.

Let me endeavour to illustrate by a reference to some of the researches of Pasteur, the great French chemist, so lately honoured by being elected one of the "Forty Immortals" of the Institute of France.

A number of years ago he was employed by the French Government to investigate the cause of *Charbon* or the splenic disease or malignant pustule in cattle and sheep, and which had been epidemic, destroying thousands. He found that it was most prevalent in fields where animals previously sick of it had died and been buried. What could have caused this? He took some and fed them with the grass growing over the graves of their fellows, and these became infected, while others fed upon grass from another part of the field remained healthy. But the difficulty in connecting cause and effect was due to the fact of these animals having died years before, and having been buried ten or twelve feet under ground. He at last solved the difficulty by that inspiration, which so often strikes the mind of the inductive reasoner. He took the material from the intestines of earth-worms, found in the soil of the graves, and injected a solution of it into the veins of sheep, when the disease was produced. Here earth-worms had been the Charons, which had borne the deadly germs across the humid Styx; and in the earth thrown out on the grass had deposited the *materies morbi*, which had produced death in the sheep.

Such germs have been proved to be the *Anthraxis bacillus*, a microscopic germ, rejoicing in the proportions of $\frac{1}{30000}$ of an inch.

Dr. W. Budd has, to all appearances, come to a similarly definite result in the question of the causation of Typhoid.

Tomasi-Crudeli and Klebs have apparently located the germ of Malaria in a microscopic plant called *Bacillus Malarie*; while Drs. Wood and Formad, of Philadelphia, in a long series of researches, have to all appearances isolated the germ of Diphtheria, *Bacillus Diphtherie*. More recently still Koch, of Berlin, claims to have proved Tuberculosis to be a Zymotic disease from the fact that he has discovered in the sputa from the lungs of consumptive patients the germ *Bacillus Tuberculosis*.

But, ladies and gentlemen, neither is there time nor is this the place to argue theories. I have in a few words defined and illustrated what is now commonly termed a zymotic disease. Let us at once confess that all is not yet decided; that though it is apparently beyond dispute that certain fungi or vegetable organisms—which like the corpuscles of the blood develop very rapidly—are present in disease; and that, though some have even defined between them microscopic differences, still the conclusions are not accepted by all.

Dr. Beale, probably the greatest master of the microscope in Britain, while admitting the germ theory of disease, does not accept it in the ordinary sense, and for several reasons.

In his great work on Bioplasm or Germinal Matter, *i.e.*, formative living matter, he states with great appearance of truth, that fungus germs (Bacteria, etc.) of exactly the same microscopic appearance as those found in the system, are always present in the blood during such diseases as Typhoid, Diphtheria, etc. But he believes that they are present because the blood has in the multiplication of the germinal masses of bioplasm already in it become so changed as to form a favourable feeding ground for the inhaled bacteria of the air, since the same *bacteria, vibriones*, etc., are found present in the mucous tissues and in the blood during various diseases, such as Typhoid, Diphtheria, Scarlatina, etc., while at the same time the phenomena of different diseases may be present. Hence Beale makes the following important distinctions:—

(1) The disease germs, which entering any system cause contagious diseases, are minute particles of bioplasm or living germinal matter, which have been developed and existed in some other living body.

(2) They consist of minute cells of low grade of *being*, practically indistinguishable under the microscope, even as cells of blood forming new muscle, connective tissue, etc., are indistinguishable; but which, by virtue of inherent qualities, develop in some cases one disease in some another.

(3) Having been introduced into the system in one or more ways, if they find abundant food, they develop with less or more rapidity, altering blood constituents, as in the case of yeast and sugar, producing the phenomena of disease; and that blood in this state is most favourable for the development of bacteria in it, being inhaled from air in which they are ever present.

(4) Of course these disease germs are endowed with very different vital powers, even as pus in various degrees of development is different in its vital properties and infectious qualities. The distinction is that according to the *Bacterium* theory, microscopic beings, animal or vegetable of their own peculiar species, are introduced into the system, feed upon its fluids if favourable, exhaust themselves by lack of nutrition, or before this stage arrives destroy the patient.

He says that the physicists who think they can see in the size and shape of Bacteria differences which presuppose them to have, on this account, different functions are unscientific; and moreover Bacteria are in the system at times without any special disease, and that inasmuch as they are always in the air such diseases would long ere this have destroyed the race.

Although much acuteness of observation has been shown by Beale as evinced by his theory, yet on the whole to me the bulk of proof seems to be on the side of the Bacterium theory, for:—

(a) By analogy we have different vegetable germs with different functions, such as *Torula*, *Protococcus*, *Penecillium*, *Mycoderma*, etc., present in varying amounts in air at different times under different circumstances.

(b) In very different amounts under the same circumstances (Tyndall).

(c) Even if present they have different degrees of vitality, like vegetable growths, due to a favourable *nidus*, or the presence of various opposing causes.

(d) Even though not physically distinguishable, it is as proper to suppose them as having various properties as to suppose his bioplasmic particles, impossible of differentiation, to have different qualities.

(e) Inoculation by cultivated *bioplasm* in Diphtheria, Malaria, Tubercle, Vaccinia, etc., produces these respective diseases.

(f) Some germs, as Typhoid and Cholera, seem to require exposure to the air in filth or excrement in order to develop fully their virulence.

(g) Many if not developed in filth, at least appear to remain vital in it.

(h) Favourable circumstances for their appearance, as filth, climate, constitution, often find such diseases absent.

(i) Circumstances most opposed to their appearance may have them present, but generally weakened from lack of *pabulum*.

(k) The virulence of these diseases, great at first, weakens with the passing away of climatic conditions favourable to germ growth, or from the exhaustion of filth materials for food.

Such then are a number of reasons for my belief in the *Bacterium* theory of many diseases; while at the same time Dr. Beale's theory has much plausibility as explaining spontaneous appearances of these diseases, or the continuation of hereditary diseases.

How introduced into the System.—From what we have seen of the almost universal distribution in ordinary air of yeast germs $\frac{3}{8} \times \frac{1}{100}$ of an inch in diameter, and how *Protococcus Pluvialis*, $\frac{3}{8} \times \frac{1}{100}$, is almost everywhere in moist mud, it will not be surprising to find that *Bacteria*, which we believe to be the specific causes of diseases, are present in air very generally, unless where, through their not having found favourable fields for their propagation, they have been destroyed by opposing influences.

Being then so readily diffusible we naturally expect such to be not only floating in air, but to be clinging to solids, as food, and to be dissolved in water. Existing then under these conditions, we can readily see with what ease they may be taken into the various avenues of the system.

But not till they reach the blood do they exert their deleterious effects. Here they grow and multiply, and, becoming obstructive in the smaller capillaries, give rise to the eruptions characteristic of the various diseases. The question of how they reach the blood may however be of interest. Inspired into the minute alveoli of lung tissue, they are almost in contact with the blood. There multiplying, the germs push themselves through the lining membrane, and are taken up by the capillaries. In the same way, swallowed with food or drink, they may get into the mucous follicles and be absorbed by the capillaries of the stomach and intestines.

But further, some, as Dr. Beale remarks, may enter through the pores of the skin. In some states of the system the cutaneous surface is softened, swollen, and moist; hence living particles can easily insinuate themselves into the pores.

Again they may enter by an open wound or scratch, since the minute particles of germinal matter falling upon the wound may there multiply, and thence extend into the soft tissue and into the blood.

Such, ladies and gentlemen, stated in a few words, are some of the principal ways by which these germs get into the blood.

Let us now see what are the *factors* which aid the multiplication of these germs, thereby inducing their fatal effects upon the system.

1. The first of these, which I believe to be of great importance, is a *soft*, moist state of the capillaries with a weak condition of their walls, following long continued congestion, due to a weak heart and enfeebled condition of the nervous system; a state most favourable for the passage of germs. Not only this, but the system is in the worst possible preparation for opposing the multiplication of germs in the blood by a vigorous circulation, which might throw them off by the various secretions. Such a debilitated state of the system, experience has shown, is that which most commonly precedes the attack of any severe form of fever.

2. *The breathing of Impure and Rebreathed Air.*—This factor may appear to many to have little foundation in fact; but the accumulated proof on this point is beyond dispute. Many have become so accustomed to living in small and poorly ventilated rooms—having, too, stoves and double windows in the winter—that to affirm there can be anything injurious in this way of living, is, in their opinion, simply to talk nonsense. But let us see! The requirements of a room ten feet square, in order that its air may be kept pure, are that the air be renewed three times per hour for each person in the room; otherwise he is breathing an excess of carbonic acid, which, resulting from decomposition of tissue, has been exhaled from the lungs. Not only this, but the air of any room has much dust in it. This dust, according to Dr. Fox, in his work on "Water, Air, and Food," contains: scales of epithelium from the body; particles of soot; small round cells or "putrefaction cells," capable of multiplication, the growth of which is aided by the bad smelling gases of ill-ventilated rooms.

Now it is evident that the blood of persons in such rooms, must not only be insufficiently oxidized to keep it vigorous and freed from its waste tissue, but that the lungs are actually receiving into them rebreathed air, loaded with organic impurities. So deleterious is such air, theoretically and practically, that Dr. McCormack, of Belfast, years ago affirmed this to be the principal cause of consumption; and our own statistics

prove that amongst women, whose lives are spent so much within doors, this most fatal disease of the calendar finds its most numerous victims.

How can it be otherwise? Not only is the body kept from being invigorated by abundance of oxygen, but it is being directly empoisoned by bad air; and assuming that germs of any disease (say tuberculosis, according to Koch's theory) be present, we can understand how, the germs being breathed again and again into the lungs and living in an atmosphere loaded with organic matter favourable for their development, they can hardly fail to accomplish their fatal purpose.

Lemaire found living organic germs especially abundant in the air of dirty prisons; while everyday experience proves that *fungi* of every kind find rich pasturage in both filthy ground and filthy air.

We now must make a few remarks on filthy air.

3. *Filthy Air*.—As our argument in favour of the *zymotic* origin of disease has taught us to expect, experience proves, only too conclusively, the truth of the theory, that these diseases are ordinarily an accompaniment of filth. Hence these have been well characterized as filth diseases.

We may here take a remark from a paper by Mr. E. Chadwick, C.B., the well-known sanitarian of London, on "The Prevention of Epidemics." He says, "Asking the medical officer what was the specific disease he apprehended, he stated that when he arose in the morning and found the atmosphere warm, moist and stagnant, he always found that there would be an increase of some foul air disease; it might be Typhoid, it might be Scarlatina, it might be Measles, it might be Smallpox; but one species or another of eruptive disease he was sure to have in such weather in the low-lying and ill-drained districts. * * * * * On passing through a low district I observed, '*surely this must be a fever nest*,' when out came some children with the marks of recent Smallpox upon them. I remember that I was once consulted by Dr. Lyon Playfair as to the readiest mode of making a sanitary inspection of an urban district without the Medical Officer's or Registrar General's returns, which there was no time to get out. I advised him to go into one of the primary schools, and select a group of the most squalid children, get their addresses, and go there. He told me he had acted on this suggestion; and that in the first school there were two boys with particularly blotched faces, and he had found that their habitations were at the confluence of some putrid sewage. On ill-paved, ill-cleansed, and filthy streets, the attacks are heavy, especially amongst children. On well-paved and well-cleansed streets the attacks are light; and it was observed that epidemics pass over those clean lines."

4. *Impure Water*.—But if filthy surroundings make filthy, impure air, what must the effect upon water be? Let us think for a moment! Take your own town for example, situated along the river valley with an underlying impervious limestone, in many places hardly covered with soil. The water must drain readily from the hill-sides toward the river. Hence it partially soaks into the soil carrying with it whatever organic materials may have become dissolved in it. Accumulated materials from the surface are borne down with it; as also, in some places, the drainage from cesspools and privies high on the hillsides into the soil lower down. Wells thus receive these impurities, and the water becomes contaminated.

Now should there have been one or more cases of Typhoid occurring on such high ground, and the excreta from such cast, without disinfection, into a cesspool draining downward, with its soakage entering into some well, we have present every element for the spread of the disease.

But perhaps the greatest misfortune in such cases is that water may contain the fatal germs of disease, and yet be sparkling and pleasant to the taste. In cases, however, where the water is malodorous and bad tasting, its peculiarly dangerous nature may thereby be detected.

A remarkable fact seems to have been established by Professor Bühl, of Munich, proving that an intimate relation exists between the prevalence of Typhoid and the height of underground water. In an article in the *Weitschrift für Biologie* he remarks:—"The variation in the mortality from Typhoid necessitates the assumption of a coöperating cause sometimes assisting sometimes counteracting the specific cause of Typhoid Fever, and

which, on its quantitative side, exists as the basis of the extension and force of the disease. But of all the elements accessible to investigation the changes in the height of underground water especially exhibit relations unmistakably indicating their connection with the spread and violence of Typhoid. So long as the underground water continues to rise the number of fatal cases of Typhoid Fever steadily falls, and *vice versa*."

He does not seem to have stated the theoretical reasons for this, but as they have a practical bearing on the subject, I may be pardoned if I state on what grounds these statements seem to rest.

(a) When the soil water is low during dry weather the water of cesspools, etc., will, by capillary attraction, readily spread laterally towards deeper openings in the soil such as wells; since, were the water high, and the soil already saturated, the lateral spread of water from such sources of pollution would be comparatively slight.

I may here state a historic case of how contaminated water is the carrier of fever, and also what great vitality the germs of many of these diseases such as Typhoid have. The village of Lausen, in one of the cantons of Switzerland, had not been visited by an epidemic of Typhoid since the passage through it of the allied armies in 1814.

On the 7th of August, 1872, ten inhabitants were attacked with the disease; nine days later fifty-seven were seized. The epidemic lasted until October. Out of 800 inhabitants 130 were sick, 100 of these being in the first three weeks. The disease occurred only in those houses getting their water from a running stream, those using well water escaped. It was afterwards proved that the privy and manure heaps of a house at some distance had discharged their contents into a stream which had subterranean connection with the sources of the stream which ran into the village. In this house on July 10th, a man had been attacked with Typhoid, and later three more cases occurred in the same house.

(b) Besides the height of water according to Bühl being an important factor in determining the prevalence of Typhoid, etc., Louis Crêteur, the Belgian chemist, has found that the more porous the soil is, the more rapidly does organic matter decay therein; and the more readily does the circulation of air and water proceed. Hence such a soil is most abundantly inhabited by the lower forms of life.

Pettenkofer shows that in such soils there is an atmosphere richer in Carbonic acid than in air above ground; and that the underground air is affected by currents, temperature, etc., in the same way as air above the ground.

5. *Influence of Winds on Disease*.—That winds have an influence in promoting disease has long been a popular fancy; and that this has some foundation in fact is beyond question. Thus the prejudice which has from early times been shown against east winds is well known; and that the prevalence of such has seemed to be attended with troubles of the respiratory organs, etc., is well known. But whether, beyond its generally cold and damp character, it possesses any peculiar and special influence in the causation of disease is not as yet very evident.

However, we do know that the course of epidemics of wide prevalence has in many cases been in the direction towards which some wind has blown more or less constantly. This, for example, has been observed frequently with Influenza. Some remarkable instances showing this fact have been given by Mr. E. Chadwick, C.B., in an address previously referred to. He there expresses his belief, in most unmistakeable language, that certain climatorial conditions have determined not only the course but the virulence of some Cholera outbreaks. He does not analyze these conditions. He cites, however, the fact that in Germany and Russia there has been a so evidently unhealthy condition of the atmosphere with some Cholera outbreaks that the rooks disappeared with their advance and returned as they receded. He supposes that they must have been conscious, either by smell or some instinct, that there was danger in remaining in the atmosphere. He further remarks that in India, at any rate, such ærial conditions move in certain directions. Thus Cholera appears usually to move towards the north-west. It passes from village to village even though there has been no intercourse between them. It passes across arid deserts with such steady course that the time of its arrival on the opposite side may often be foretold.

But he confesses that, though this be true, the contagiousness of Cholera by contact

is sufficient to spread it in all these cases. Hence we must ask, what does the wind do in inciting disease?

We know it may bring cold and damp, chilling the body and so inducing many disorders. I have been credibly informed by a practitioner of long standing that, where Diphtheria is at all prevalent, it seems to break out with renewed violence after high, cold winds. No doubt, however, the general effect of high winds is good in that they tend to lift organic particles upon which germs of disease feed, into the air, and so aid their destruction by oxidation. This process however, like many others fraught with good, mixes the bitter with the sweet, since germs that lie quiet and harmless are thereby disseminated. Thus the *miasm* of marshes has again and again been found to extend in the direction of some prevailing wind; and that it is a material something is proved by its progress being often impeded—even stopped by forest areas, or even clumps of trees. But we may readily assume that in other diseases besides Malaria there are living germs. Thus:—

(a) In some of the worst outbreaks of Cholera there has been previously a long period of calm, during which the air has become laden with organic material, and this being more or less unoxidized has afforded abundant food for the development of disease germs.

(b) In such calms there is too often an undue absence of ozone, the active oxidizing agent—an additional reason being thus supplied for the increase of germs.

(c) The disease which has, as an epidemic, progressed in a certain direction with the wind cannot be carried backwards to any great extent even though it be infectious, the reason for this appearing to be that, as in the case of an outbreak of Cholera among the troops returning from Afghanistan, the food or organic matter upon which the germs are nourished has been destroyed either by ozone and air movements, or that the first spread of the germs has exhausted the supply of organic nourishment. This latter explanation is in keeping with the fact that in epidemics it is commonly in the early periods of them that the greatest violence is attained. This fact, however, may be partially explained by people appearing to become more or less acclimated, when they have been exposed for a length of time to air bearing the germs of some specific disease.

6. *Influence of Temperature.*—The influence of this is deserving of a short notice. Believing as we do in the germ theory of disease, we can in some degree understand why some diseases are more prevalent in cold weather and some in warm, some in moist and some in dry weather, by reference to the life history of the higher plants, to biological facts, and to statistics:

Thus some plants flourish only in a tropical, some in a temperate climate; while others again, like the red snow of the Arctic Circle, flourish only in frigid regions.

Again we know that yeast may be rendered inert at a temperature of 212° while Bacteria, Vibriones, etc., flourish in fluids which have been heated up to 300° F.

Further, Intermittent Fever germs have their activity destroyed by frost, and Diarrhœa increases rapidly at a temperature higher than 60° F. Smallpox and Typhus seem to have the activity of their germs rapidly lessened by the influence of summer heat; while the Typhoid wave beginning to rise in August attains its maximum in November.

Whooping-cough, again, increases from December to April, and then recedes; while Scarlatina, increasing with June, reaches, according to British statistics, its climax in October.

Hence we can readily see that in disease there are certain factors necessary for its development, such, for instance, as different races of men and animals, and different temperatures and surrounding conditions.

Having now discussed at length *zymotics* in their nature and causes, it becomes necessary for us to turn our attention to their effects and prevention.

The effects of these diseases are only too mournfully evident to all to need amplification; but it may serve to impress upon us what this sickness and death from preventible diseases means, by stating that in England and Wales, imperfect as are their sanitary improvements, the death rate has been reduced by them by four and a half per cent., at a saving annually of a quarter of a million of lives, and three million cases of sickness. It has moreover, in a material sense, saved some four million pounds of money in medical and funeral expenses—not mentioning the untold value of the labour which is preserved to the country.

Should these figures, however, seem incredible, let me give you a single example from our own mortality tables. In 1880, with a population of about 2,000,000, there were recorded 822 deaths from Diphtheria alone. Not to speak here of sad memories and desolated homes, nor yet of the cost of medical services and funerals, we need only refer to the material loss sustained by the country in the *productive* power of these many lives, each male in Canada being calculated as yearly producing wealth to the value of \$400 to the State.

Precautions against the Outbreak of Disease.—To this part of our subject, ladies and gentlemen, I have no doubt but that your interest and attention will most willingly be given. Not alone in the periods when epidemics are present will you, I trust, deem it necessary to take precautions against them, but you will endeavour to exercise that care, by which alone we can hope even to lessen, much less to eradicate, these dread scourges. We may then first direct our attention to the conditions in which we all daily live, move and have our being. And we cannot do better than begin at home.

We have already seen how imperfect ventilation debilitates not only from its causing an absence of oxygen, but also an excess of carbonic acid and of other animal exhalations from the lungs and skin. In addition to this we have seen that impure gases from our stoves in winter, and burnt and dried dust from our over-heated furnaces both tend to enervate and weaken the powers of the system to withstand the attacks of disease. To these we must now add the fact that modern conveniences have placed our water-closets in many cases in our houses, and in every case have connected our sinks with cess-pools and sewers, with the danger ever present of contamination of the air of our rooms by the volatile products of organic putrefaction. To these I may add another most important factor—the presence in many cases of damp air continually rising, with the unwholesome products of organic decomposition of the soil under our houses, into the rooms by the draught which supplies air in the place of what passes up the chimneys. The same danger lurks in our cellars, too many of which are not kept in a clean and healthy condition.

Presupposing then, that all recognize these facts, our duty must be to adopt means for their prevention or removal. And amongst these means we place first *ventilation*. Fortunately for us we have in our houses a large amount of *spontaneous ventilation*.

Prof. Pettenkofer has shown that through a room of brick walls of 2,650 cubic feet of area, every hole of which has been plugged up, 1,060 cubic feet of air passed per hour, by virtue of the difference of temperature (34° F.) between the outer air at 32° F. and the inner at 66° F.; and that, with a difference of temperature of 92° F. between the outside and inside of a room, the spontaneous ventilation through a free wall amounted to about seven cubic feet per hour. This is due to the porosity of the ordinary building materials such as limestone, brick and mortar. The amount of this ventilation depends, of course, largely upon the walls being kept free from damp. In addition, however, to this, and in a much more important way, we have spontaneous ventilation to a large extent in winter by means of the cracks in our floors, under the doors, about the windows, etc. In this connection I may mention what, in my opinion, is a bad result of one modern convenience—I mean *double windows*.

Let me illustrate. Their use is, as we all know, due to there being between the two windows a stratum of air, which is but slowly influenced by the cold air outside or the warm inside air; in fact it keeps the cold air out, the warm air in. But what is the effect of such an arrangement with the temperature of an ordinary winter's day of, say, 66° to 70° inside, and 25° to 15° F. outside the house? There is, by the rise of warm air in the chimney, a rapid emptying of the room of its air, which air must be replaced from some source. Now, if the windows are almost completely impervious, there must necessarily be a great draught of cold air through the cracks of the floor and under the doors, which cold air, entering the room at the bottom, must largely be kept there by its weight; hence the result so commonly seen, that our ladies, and indeed all, are constantly troubled with cold feet—of all causes I believe the most fruitful in the production of colds and their attendant evils. Here then, we must see, is one fault in ventilation readily prevented. Let what air will enter by the sides of our ordinary windows—it enters gradu-

ally and, as it descends to the floor, becomes warm, and so the temperature of the room is equalized.

But we must proceed farther. With proper precautions against a draught, in the shape of a screen, abundance of fresh air will enter if the upper sash of the window be slightly lowered. Now you will perceive, ladies and gentlemen, I am speaking in a practical way, and not proposing any expensive, and therefore impractical, scheme, but one which all may take advantage of. No doubt something in the shape of an air shaft in the chimney, by which the fresh air is warmed ere its introduction into the room, is better; but many here, from the way in which these houses are built, would find this both expensive and difficult.

Again, let there be for two hours a day an opening in succession of windows in bed-rooms, etc., whereby great draughts of fresh air may not only replace the contaminated air of bed-rooms and sitting-rooms, but by means of which a thorough oxidation takes place both of the animal exhalations which are being continually thrown off from the bodies of the inmates, and of the vegetable odours, which too often permeate the rooms from the kitchen.

Then, too, there are the impurities from illuminating and coal gas,* etc., which ought to be removed.

As Dr. Cameron, Professor of Hygiene in the Royal College of Surgeons, Ireland, says: "The great advantage of keeping open every window in the house for a few hours daily is the admission of so large a quantity of air whereby the organic matter floating in the air of the apartments cannot escape oxidation. The organic matter given off from animals requires prolonged exposure to pure air before its noxious properties are perfectly destroyed." To illustrate the value of this procedure, he remarks "that wind, travelling even at the rate of one mile per hour, and allowed to pass freely through a room, renews the air in it 270 times in an hour."

Such, then, is the first precaution which we are to look to if we expect to advance far in our task of repressing disease.

We next come to conditions *external to our houses*.

Here it hardly seems necessary to speak of the wisdom of cleaning away filth. Apart from its injurious influence, it is unpleasant to both sight and smell; but more than this our own experience, as well as that of every writer, tells us that in crowded, filthy surroundings, where little sunlight and insufficient pure air can get, zymotic diseases find most abundant pasturage. But I must advert to one point, and it is one which our studies have already brought us to, viz.: the wisdom of locating our wells—if they must be used—on higher ground than the privies, where, if possible, the drainage is from the former towards the latter, and in any case to have the well at least 100 feet from all privies, cess-pools, manure heaps, etc. If an out-door system of closets must be made use of, then let deodorants and disinfectants, such as ashes, etc., be utilized. If soil-pipes and sewers be used, then it must be seen to that the air of decomposing sewage be prevented (by having traps on the house drain, etc.) from rising into the house.

But on this large subject of sewerage I must defer further remarks than to say that I believe open street gutters, with all their unsightliness, are much better than sewers into which people run their soil-pipes and drains, without proper precautions to keep the sewer gas and germs developed in the putrescent sewage materials out of the houses. Indeed, the idea that out of sight means absence is no longer pardonable in the light of modern science. Many, indeed, in our smaller towns, seem to have taken the greatest pains to make sure of getting an outbreak of Typhoid introduced into their houses by providing a safe passage-way thereto by house-drains for the germs of whatever disease may have been prevalent in other parts of the town.

Prevention of Diseases from extending when once present.—To this point I must be pardoned if I ask my professional brethren, as well as the public—their patients—to especially address themselves. After these various hygienic precautions have been taken, it will occasionally occur that carelessness in some one of many ways has introduced a case of some zymotic disease into the town.

* The burning of an ordinary gas jet gives off 45 cubic feet of carbonic acid (CO_2) in an hour, or about three times as much as a man.

This, then, being the case, I say to the general public to at once get the advice of your medical man, and second to the medical man I say, where there is any probability of any zymotic disease being present in its initial stage, let the parents or family be earnestly warned as to their duty. Let the patient be isolated, placed in an upper room, and let none but the mother or nurse visit the sick-room. This having been done, let every other person who has been in the house be thoroughly disinfected by having his clothing subjected to the fumes of burning sulphur. As in most cases of children's diseases the other children of the family where one is sick have been already exposed, let these be kept from school, and apart from all other children.

As to the Sick-room.—Here we have opportunity for the greatest care or the greatest carelessness being exercised. But the directions in this regard are so clear, unquestionable, and imperative, that none can afford, either for the sake of their own households or of the public health, to neglect any one precaution. I cannot do better than direct your attention to the concise, yet ample directions given in the pamphlet issued by the Provincial Board of Health. Thus:—

"The bed-room of a person sick with Scarlet Fever, Diphtheria, Smallpox, or any other infectious disease, should be cleared of all needless clothing, carpets, drapery, or any material liable to harbour the poison of the disease. The room should be large, having an absolute air-space of at least 1,000 cubic feet for each individual, and should have a liberal supply of fresh air—at least 3,000 cubic feet per head per hour. In summer the supply should be unlimited; windows thrown open, and draughts on the patient prevented by a fine gauze or wire netting, slanting from the top of the sash to within two inches of the ceiling.

"Discharges from the throat, nose and mouth should be received, or immediately placed, in vessels containing some of the disinfectants named for that purpose in sec. 8; if on rags or handkerchiefs, these should be immediately burned. Likewise, the discharges from the kidneys and bowels should be passed into vessels containing a pint of disinfectant, and immediately buried at least a hundred feet from any well or other drinking-water supply. If these precautions are impracticable, let the discharges be passed on old cloths, which should immediately be burned.

"For convenience, a few disinfectants are here grouped together:—

"(1) Solution of chlorinated soda (or lime).

"(2) " chloride of zinc : water, 1 gal.; sulphate of zinc, 4 oz.
common salt, 2 oz.

"(3) Copperas solution—1½ lbs. commercial sulphate of iron to 1 gal. water.

"Purification of Clothes and Bedding.—The best plan, where practicable, is by the agency of heat. Dr. Henry, of Manchester, disinfected scarlet fever clothing by exposure to 212° F. for one hour. A brick oven or portable furnace will answer the purpose, the clothes to be disinfected being hung on wires. Boiling clothes is not so good as baking, but still is useful. To every ten gallons of boiling water add half or three-quarters of a gallon of commercial solution of chloride of lime; or the clothes may be laid for twenty-four hours in a solution of sulphate of zinc in the proportion of 1 to 120, or of chloride of zinc in the proportion of 1 to 240 (Sec. 8), and then should be washed with soap and water if they cannot be baked.

"Nurses and attendants should be required to keep themselves and their patients as clean as possible, disinfecting their hands frequently by chlorinated soda or other disinfectant. Attendants should also wear cotton or linen (not woollen) clothes or overalls, to which particles will not so readily adhere, and which may be more easily disinfected."

Were these precautions which I have mentioned taken by all, epidemics would no longer be possible. Isolated cases of these diseases might occur, but anything like a general spread of them would be wholly prevented.

Of course, travellers, immigrants, etc., will occasionally introduce some epidemic disease, of which we have a good example in Smallpox; but of this we have an admirable example of what can be done in quickly stamping out epidemics, by the fact that in some five places during the past six months it has appeared in the Province, and in the worst outbreak only some thirty cases were allowed to occur. Could the public be so edu-

cated in the case of Scarlatina and Diphtheria as of Smallpox, these might be stamped out in a similar way. But because these, in their outset, are often mild; because some mild cases of these occur, and hence the diagnosis of them by the physician is not made—and if made, his directions as to isolation, disinfection, etc., are not minutely carried out, or, I am sorry to say, have not been impressed by him with such a definiteness upon the people as to cause them to be heeded—for these many reasons these fatal scourges are allowed to carry on their deadly work.

It is on account of these several facts that it has become incumbent upon the Governments, general and municipal, to take up the question of how to legislate most effectively for the people's good; and to ask themselves the question, does not the people's good so incorporate and comprise the individual good, that it demands that individual opinion should be subservient in such matters to public demands?

The Legislature by the Public Health Act of 1873, and by the amendments to this in the Public Health Act of 1882, has decided this question in cases of wide spread epidemics. It has given municipalities full powers to do as in their opinion seems wise for the public good.

Hence your Local Board of Health has a right, and ought, in the public interest, to be informed of every case of contagious disease which occurs, in order, if possible, that the disease may be traced to its true cause, and that every means be put into play for its suppression. In other words, the patient should at once be isolated, the premises disinfected, and all drains, wells and privies at once examined thoroughly. These latter are special reasons why the Board of Health should have cognisance of the matter, since it can hardly be considered as coming within the province of the physician to make a special examination of these, although we are happy to know that many do so.

But more than this, all cases being reported to the Local Boards of Health, they, by their Health Officers, knowing that some particular locality is most infected, will probably suspect the true cause, say of Typhoid, in some main sewer, or some house which has had fever in it, supplying germs of disease by its drains to neighbouring houses with untrapped sinks and water closets, or by the contamination of some adjacent well.

It seems indeed that the time has come when the judicious action of the Local Board of Health in these regards will be so appreciated that no family and no physician can have any scruples or difficulty in making common cause with the Board of Health in such matters.

We all know, unfortunately, how slow the public are to accord to the Local Board through the Council sufficient remuneration to employ a thoroughly competent man—in fact a physician seems to me to be the only true Health Officer—as Health Officer, a man, to use the happy French expression, *sans peur et sans blâme*—fearless and blameless. Why, if we only think of it, the expenses connected with a dozen cases of *Typhoid* would more than pay the expenses of a medical Health Officer for a year; and does it not seem much better that a whole community be slightly taxed and be healthy, than that a smaller number should be heavily taxed and be sick—to speak of nothing more?

It seems proper, then, to urge upon your town the propriety of at once establishing an active and efficient Board of Health—if it has not already done so—with full powers and means for thoroughly and systematically guarding the health of its citizens, with as earnest and untiring zeal as if some hostile army were advancing to the destruction of life and property.

But I have already too long trespassed upon your patience, and am afraid that in attempting so much, that in endeavouring to overtake some of the difficult questions in the causation of disease, I may have dwelt too briefly upon what is of prime importance—that of preventing it.

But in truth, after all, I believe that if we can in some degree come to properly understand what are the chief factors in the causation of diseases, the measures for their prevention are sure to follow.

We have seen how indefinite have been the ideas until very recently, of even the greatest minds, concerning the peculiar agencies which cause disease; we have seen that through the imperfections of scientific methods of research this could not have been otherwise; but we have shown, too, that the light of science is fast illuminating the dark abodes.

of Nature's mysteries. We have traced the life history; the mode of origin and development of the minute organic beings—germs or ferments, which by their multiplication in the tissues and blood of animals, cause fatal outbreaks of disease, and in our doing this have, we trust, pointed out that in aiding the conditions favourable or otherwise for their development, man himself is largely responsible. Such development we have seen dependent upon debilitated states of the system to which modern social and commercial life so largely tends; upon badly ventilated apartments and uncleanly external surroundings; upon water contaminated with surface drainage and sub-soil pollution; and upon meteorological conditions, either of the dry and hot weather of the summer days, or the bleak and cold winds of the winter months.

But though it may seem as if the old-time myth be true that Jupiter Tonans still shows his hatred to the race of men by presenting to them with modern comforts a Pandora, who, though sweet and beautiful, has brought dire calamity upon the generation of men by taking off the lid from the box whence have come strife and war, plague and sickness, grief and sorrow; still we are made happy by the remembrance that in this Pandora box Hope, gentle and sweet, remains, telling men that with all the woes which they are heir to, they still have her angel presence with them, encouraging them to work, by their virtue lessening human wrong, by labours of mercy alleviating human suffering, and by their abiding trust, helping them to still cry out, like Promethens of old amid the flashing lightning and the loud-pealing thunders of Jove, "the day is coming when good shall triumph, and the power of evil shall be destroyed and crushed for ever."

In this field, then, of Sanitary science, where there is so much room for earnest workers; where by lifting people from physical misery advance may be made in moral progress; where not the physician alone, but every member of the community may do his share in lessening the number of mourners and in quieting the wailful cry of the orphan, I cannot do better in closing than by saying to each, in speaking to all in the words of Goëthe:—

Heard are the voices!
 Heard are the sages,
 The worlds and the ages!
 Choose well! Your choice
 Brief and yet endless;
 Work and despair not!

ARTICLE IV.

SCHOOL SANITATION: ITS NECESSITY AND METHODS.

BY DR. P. H. BRYCE, M.A.

*(Delivered before a Public Meeting of the Brant County Teachers' Association,
November 10th, 1882.)*

MR. CHAIRMAN, LADIES AND GENTLEMEN,—In appearing before you to-day in the capacity of a lecturer on public health, I deem it my duty to explain to you how it has happened. Some time ago I received a communication from the Secretary of the Mechanics' Institute of your city, inviting me to lecture, under its auspices, on some health subject; and the evening most convenient for this had been fixed upon as to-night. But the meeting of your Association has prevented the carrying out of the first proposition; and it is only in consequence of the painful circumstances which have prevented Dr. Henwood from appearing before you that I was invited to occupy the time assigned to him. I can only hope that I may in some small degree make up to you the disappointment you will have experienced from that gentleman's absence by, at the most, imperfectly touching upon some topics which Dr. Henwood's well-known ability and long experience would have enabled him to handle in so masterly and able a manner.

I have chosen this subject for several reasons, some of these being the fact that I have already discussed before public audiences within the past three weeks several very important sanitary questions; and again, because the urgency of my present subject is felt most keenly by those of you more especially engaged in the profession of teaching, and because you will most readily appreciate any endeavours to bring such matters before the public with a view to improve conditions which have so direct a bearing upon the health of one very large portion of every community—the school children and their teachers.

Although very many and great improvements have been introduced into our school system since the passage of the new Act in 1870; though great advances have been made in the size and general arrangement of a great proportion of our school buildings; yet there are still so many defects in the every-day management of our school-rooms, either through defective heating and ventilating appliances, or through the lack of knowledge on the part of many who control school-rooms, that reform in some of these directions is not only most desirable, but in the highest degree urgent. In discussing the subject I shall divide my remarks into two parts:—

I. What are the unsanitary conditions almost constantly present in our school-rooms?

II. What practical methods can and ought to be adopted for the improvement of such conditions?

Under the first part we may briefly discuss the following points:—

1. The too great number of children generally present in any school-room.
2. The fact that their developing systems are very impressible, *i.e.*, most susceptible of influences, militating against their healthful progress.
3. The influences which are daily at work promoting, or the opposite, this healthy development.

Under the second part we shall refer to—

1. Methods for the promotion of ventilation, to keep the air, and hence the respiratory passages, clean; and for the equable distribution of warmth, so that the inmates of our schools may not be injured by cold and draughts.
2. Sufficient supplies of light.

Now, it will readily be seen that we have an extended course before us, hence I shall endeavour to dwell most largely upon points deemed most important, passing briefly over others which, though in truth of great importance, are yet on the whole less urgent.

I.—WHAT ARE THE UNSANITARY CONDITIONS ALMOST CONSTANTLY PRESENT IN OUR SCHOOL-ROOMS?

1. *The too great number of children; or, in other words, the overcrowding of school-rooms.*—To at once come to the point, either every individual child, impressed into the school-room from four to six hours every day for ten months of the year, requires a certain amount of air space to breathe in, or he does not. Suppose that he does not; then why not utilize our school space by increasing the number of sittings in each room still further? But practically our School Boards, and the community at large, recognize that each child does require a certain breathing space. Now let us see if scientists have recognized any definite amount of air space as necessary for each individual; and if so, what are their reasons therefor?

The facts, then, practically acted upon are: (a) That the act of breathing exhausts the vitalizing elements of air. Everyone has and does experience this in greater or less degree. But let us examine this well-known fact more minutely and most briefly by an experiment. Leave a glass of clear lime water exposed to fresh air and it remains clear. Breathe into it and in a few moments it becomes turbid. Here, then, we have proved that something is exhaled from the lungs which is not present in any great degree in fresh air. All know what this is: carbonic acid (CO_2), a gas composed of C and O, which, combining with the dissolved quicklime (CaO), forms carbonate of lime (CaOCO_2), and which, not dissolving in water, appears there as a suspended white powder. But whence, someone asks, comes this carbonic acid? Most here know. It is formed by the union of the oxygen we breathe with materials in the blood containing carbon. Evidently, then, any given amount of air which may be supplied, say in our school-rooms, must contain a limited amount of this oxygen. Hence if we breathed this long enough we would consume all of its O. But this we will see could not be done. Let us, however, turn this fact over in our minds, and by comparison see what results from combustion in another way than in the lungs. Make the experiment which anyone can verify for himself. Light a lamp, and we know that a current of air constantly passes up its chimney; and further, that if gas coming out of the top of the chimney be allowed to come into contact with limewater, the same white appearance is seen as in the previous experiment. Evidently the result is the same in both cases.

One step further to complete our argument. We have by inference concluded that if carbonic acid (CO_2) is the result of the union of the oxygen (O) inhaled with carbon in the lungs, that from a given amount of air the oxygen would gradually be used up. But with the lamp we can prove this experimentally by simply holding a burning match under the perforated holes of the lamp burner, when the flame of the lamp immediately begins to flicker, and if the match is kept there the lamp flame will be extinguished. Two things have occurred here. The match has used up the supply of oxygen which fed the lamp flame; and, further, a warm current of air, composed mostly of CO_2 and N, has passed up the chimney, in both of which gases a light is extinguished. The fact then must be perfectly patent to all that the act of respiration is similar to that of the combustion of carbon, where O is used up and CO_2 is obtained.

The next step in this question of over-crowding is:—But how much O is present, and how much is required in order that its exhaustion and the increase of CO_2 may not impede, much less extinguish, the vital fire obtaining its draught by the lungs? The calculation is simple: every ordinary respiration of an adult takes by inspiration about 30 cubic inches of air into the lungs, almost the whole of whose oxygen is used up; while in expiration the same amount of air is given off, five per cent. of which is CO_2 . Multiply these 30 cubic inches by the number of respirations, say 16 in a minute, and we have 480 cubic inches of atmosphere exhausted of its oxygen every minute, and 24 cubic inches of carbonic acid (CO_2) taking its place. This calculation is true, likewise, for the child, since an increased number of respirations and more rapid tissue-change make up for the difference in lung space. But ordinary air contains normally some three or four parts of CO_2 in every 10,000, and the greatest sanitarians state that when the proportion of CO_2 increases to eight or ten parts in 10,000 depressing effects begin.

To give you an example of how CO_2 is increased in crowded rooms, Dr. Angus

Smith, as the results of his experiments, states that in Chancery Court, London, at seven feet above the ground on 3rd March, 1864, the doors being closed, there were 19.3 parts CO_2 in 10,000, and at three feet above the floor there were 20.3 parts in 10,000. Again, in Surrey Theatre, one of the largest in London, there were in the boxes at 10 p.m., 11.1 parts in 10,000, and at 12 p.m., 21.8 parts in 10,000 of carbonic acid. Such facts have brought experimenters to the conclusion that each individual requires that a cubic air-space be allowed to each individual equal to a room of 10 feet square, and that to keep the CO_2 in it at a point not higher than six parts in 10,000 this space must have its included air replaced by fresh air three times every hour.

Surely, ladies and gentlemen, these facts stare us in the face with such a stern persistency that we shall set ourselves to work to endeavour to bring about remedies where such are needed—and where are they not? As remarked by Dr. Andrew Wilson, Edinburgh, “It is this CO_2 which is responsible for sleepless nights in badly-ventilated rooms, and it is CO_2 which is responsible for cutting off a large number of children of the poor through inducing early lung disease.” I may add that it is this CO_2 which is responsible for the pale and delicate teachers of many of our schools, for that mental and physical fatigue which so disinclines them, especially ladies, to take exercise, and hence by enervating physically induces indigestion and mal-assimilation in its many forms, and, as has been shown by McCormack, of Belfast, and more recently by Dr. Workman, is potent to produce directly consumption, and indirectly mental disease.

But what is true of our teachers is in many ways more largely true of the children of our schools, and thus we are brought to the second point to be considered under Part I., viz.:—

2. *The fact that the developing systems of children are very susceptible to influences militating against their healthy growth.*—In many ways the growth and development of the child is by the ordinary community looked upon as if but little, if at all, different from what goes on in adult life. But I trust that a few brief remarks may serve to point out the enormous difference between the two. In embryonic life the formative powers of the new being are wholly exerted in the development of the fabric—the organic portion of the child. But with birth an enormous development is added to the previous, viz., that of the development of the animal functions. These are developed by the stimulus of sensory impressions, and hence mean a corresponding growth of the nervous system. Habits of observation by every organ are formed. The education of the organs of sense has begun. And here, it must be noticed, is a great field in which the child's education may be advanced by parental instruction. But all of these exercises are developmental influences upon the nervous system. Inasmuch, however, as the exercise of nervous energy means an expenditure of proportionately the largest amount of force, we are not surprised that it is soon exhausted, and that a very large amount of sleep is necessary for the child. Let this be disturbed in any way, and injurious effects upon nutrition occur. We see this extreme impressibility, for instance, in the fact that the irritation of nerve tissue by the growing tooth, or the irritation caused by unsuitable food in the stomach and intestines is often enough to so affect the spinal nervous system as to induce convulsions, often ending in death. But, as Dr. M. Hall remarks, “the effect of such nerve irritation is much or little, according to whether good air, warmth and good diet have or have not kept up the powers of nutrition.”

In addition to the fact, then, that newly formed nerve tissue is extremely impressible, we have another important fact to remember, viz., that the reconstruction of the fabric, in other words tissue change, goes on in children with enormous rapidity. Hence the demand for abundance of oxygen to aid the combustion of waste tissue, and enable its place to be taken by fresh nutriment to be assimilated—the necessary condition for its growth—cannot be overstated. Thus we are all aware of the fact of how much more food the child will eat in proportion to its weight than does the man; and there is likewise the coincident fact that proportionately more carbonic acid is exhaled, and more urea given off by the kidneys and skin than is the case in adult life.

We are now quite prepared for the corresponding result, that during all this time the vital forces have been exerted in a formative way, expended in the production of nervo-muscular vigour. Hence we all know that in cases where a child grows very

quickly its nervo-muscular energy is slight, and that the child is easily fatigued. And further, we notice that in cases where the growth and transformation of tissue are slower this nervous energy is greater.

What we have here seen in children, and in different individuals in their growth towards manhood forms the intent and point of the remarks under our next heading, viz. :—

3. *What are the influences daily at work militating against this healthy development.*—Placing them as they occur to us, they are :

First, as we have already seen, *impure air*. We have seen how great are the debilitating effects of the carbonic acid of the air of school-rooms, and how great the lack of oxygen. But we have, in addition to this impure, *rebreathed* air, other unhealthy materials inhaled. Certain animal odours are thrown off both from the lungs and surface of the body. Scales of epithelium are also found in the air, and these various organic substances form favourable feeding grounds for the spores of microscopic fungi which float in the air as dust, causing zymotic diseases.

Second : We have an undue amount of dirt and dust in the air of the school-room where there are many small pupils. They carry it on their clothes and boots. It is daily stirred up, and so is inhaled, producing irritating effects on the air passages.

Third : I have already stated that unequal warmth produces serious effects on many pupils. The child's body, for reasons we have already seen, is impressible in a very large degree to the favourable influence of heat, or the unfavourable effects of cold. Why this is, is evident. Cold, like all other sensations, impresses itself more readily on nerve-tissue in the young than in the adult. Hence, it readily chills the body externally, tending if prolonged to induce internal congestions—colds, and often worse. But not only are evil effects thus produced, but radiation of heat and evaporation from the surface of the body induce cold ; and in many cases this is excessive from an insufficient or non-flannel clothing, which is the best from its being a poor conductor of heat. The mistake is made by many in thinking children do not need any warmer clothing than adults. But inasmuch as the vital processes are more rapid, and the child's body is more an automatic reflex of surrounding conditions than that of the adult, so any adverse circumstances, such as insufficient food or clothing, will produce more rapid and lasting injuries to the system than where such are acting upon the adult body where tissue change and vital force move more slowly.

Fourth : While the child's system tends to repair under favourable circumstances more rapidly than the adult's, so is it impressed more easily by injurious influences. It lacks the resistance which is volitional to a greater extent in the grown person. This latter is so great in some that the assertion has been made "that the man who resolves not to take a cold seldom does." In the child this power is wholly absent.

We have the more unfortunate circumstance present in the fact that the already delicate child, or the child weakened by the depressing conditions of bad air, poor food, and dress, has but little resistibility in its system to the onset of colds, contagious disease, etc.

That all these cases mentioned produce most unfortunate effects I deem it hardly necessary for me to assert. What teacher here, or what lady or gentleman present, does not know some boy or girl who, previously bright, sturdy and active, on going to school is seen for weeks and months gradually growing thin and pale, complaining of slight headache, and having a disordered stomach, with possibly other evils? Can we blind ourselves to the causes, such as the long weary hours for the child, whose natural condition and element is activity, sitting in air made impure by the breath of many others, and often with the emanations from their filthy clothes and bodies, and subjected to chilling draughts from attempts to remedy the humid air by wide-thrown open doors? Add to these that in some unfortunate children, with undue or precocious cerebral development, their young minds have impressed on the soft, forming and untried tissue great stores of facts, gained, not by healthy observation through the natural methods of sight and sound, but by a packing of the memory, through exciting the emotional desire of excelling, with multitudes of undigested facts, and we have a combination of unhealthy tendencies which do not augur well for the development of the race which is growing up.

II.—WHAT PRACTICAL METHODS CAN AND OUGHT TO BE ADOPTED FOR REMEDYING THESE EVILS?

1. *Methods for the promotion of cleanliness.*—By the word cleanliness, in a sanitary sense, I trust we shall see that very much more, indeed, than many imagine is implied. Thus we can see that it may include the air we breathe, *i.e.*, whether it is pure or impure, clean or unclean; the air we see with, whether bright and clear, or dark and dismal, made worse through the presence in it of much dust—often of what Prof. Tyndall calls the “dust of disease.” Again, it includes the water we drink and wash with, whether clean or the reverse, without meaning its taste or even its appearance but its actual freedom from the dust of disease—disease germs. The clothes we wear are an important factor here, since, as many are aware, germs of disease are borne most readily on the clothes, and very frequently on those of children. This latter point, too, is intimately related with the state of the skin next the clothing. Nothing probably in all our remarks is of greater importance than the state in which the skin of children is kept, both as to cleanliness and warmth.

Let us, then, very briefly discuss these various points:

(a) *Ventilation, or the cleanliness of the air of school-rooms.*—Upon this point I shall dwell at some length, believing, as I do, that untold harm is resulting from the insufficiency of abundance of warm fresh air in our ordinary school-rooms.

We have already studied the physical principles which make such supplies of fresh air necessary. Are such found present in our schools by the ventilation which is ordinarily supplied in them? It has been found by a Committee of the State Board of New York that there is in that State not more than one in every fifteen schools with means for a sufficient supply of wholesome fresh air; and that in those cases where it is good its excellence depends mainly upon open windows, and proper facilities for controlling them. It would not be possible, nor does it come within the scope of this lecture, to give at length the various methods which have been, and may be, adopted towards the end of supplying fresh air; but I shall endeavour rather to explain the principles of ventilation, and then merely indicate the directions in which improvements may be made.

The first point to be remembered is the constitution of ordinary air, *viz.*: Oxygen, 21; nitrogen, 79, with carbonic acid in small amounts, normally 4 in 10,000 parts, and aqueous vapour in varying amounts. We have already seen that this air in an inhabited room never remains long in the same condition, since each individual uses up about 24 cubic inches of oxygen per minute, and gives off about the same amount of carbonic acid.

In addition to this, however, the air given off from the lungs carries with it a very considerable amount of water, some seven grains, according to Fünke, every minute. Now this evidently must remain suspended in the air as vapour. It seems almost needless to calculate this, but we find that the amount of vapour which a cubic foot of air at 60° F. can hold is nearly half a pound. Now the point we wish to make clear here is that large amounts of vapour exhaled from the lungs of many children must materially lessen the amount of oxygen per cubic foot of air. Hence we have the oxygen of the air of school-rooms rapidly diminished, by consumption first, and secondly, by displacement by carbonic acid of the water vapour. Now we readily conclude that new supplies would be needed, first to replace what has been converted into carbonic acid, and, secondly, to remove the aqueous vapour, whose condensing particles not only make a dank atmosphere, but actually occupy the space which is required to be filled with fresh air.

How then are we going to accomplish these desired ends? In the first place we must supply for each consumer of air—each child and teacher—an amount of space, according to an American Committee of Experts, of at least not less than 15 square feet of floor area in a room 14 feet high, or about 4 × 4 feet. In British barracks the regulation amount per man is 1,000 cubic feet. But supposing that each child gets a minimum of 1,000 feet, the air requires to be changed, as we have seen, thrice hourly, in order to be kept from feeling close. Reduce this cubic space by one-half, and, of necessity, the air must be changed twice as rapidly in order to maintain the air at the same degree of purity. Prof. De Chaumont, of Netley, informs us that the air of a room cannot be changed at most more than six times an hour—once every ten minutes—without producing a draught. So we

can easily see that Dr. Lincoln's minimum of 300 feet, in his Report to the New York State Board, is very little indeed for each child.

It will be noticed that we have not, in this calculation, made any allowance for the deleterious effects of water vapour, or the dust so constantly being set in motion by the children's boots, so that, at the best, this air will be imperfectly pure.

Dr. Lincoln tells us that in the New York schools, where best done, the needed supply has been obtained by the judicious use of windows as inlets for fresh air. But before there can be an ingress of fresh air into a room there must be an egress for the internal impure air. All are perfectly well aware of the laws upon which this ingress and egress depend. They are, first, the law of expansion of gases by heat, and, secondly, the law of diffusion of gases, which is inversely as the squares of their densities.

Now this expansion of gases by heat necessarily makes them lighter; and thus Pettenkofer has found that at all times, whenever the internal atmosphere is higher than the external, there is an egress of warm air and an ingress of cold air—in other words, there is always a current moving towards the house. He found that in a house made of brick, with a capacity of 2,650 cubic feet, with all the cracks plugged up, and with a difference of 34° F. between the external and internal temperature, spontaneous ventilation went on through the room at the rate of 1060 cubic feet of air per hour.

Thus we have seen that both the agencies, diffusion and expansion of gases, would be at work in this case.

Take an ordinary case, however, and we know that the warm air rises to the top of the room, and escapes by apertures there, or if not, it is gradually drawn up the chimney by the draught of the stove. In most of our ordinary schools, however, there has not been any regular arrangement made for the supply of the air which is to take its place; but it enters principally through cracks in the floors, under the doors, and sometimes by the windows. But there are objections to both of these methods, especially the first, since great currents of cold air are being continually drawn along the floor, creating a draught, and chilling the feet of all with, often, disastrous results. Indeed, I have found what any of you may find, that in such a room there is a difference of often 8° to 10° F. between the temperature at the floor and six feet above it. The old principle of keeping your feet warm and head cool is exactly reversed.

The advantage of bringing air in by the windows is that a cold current enters the room at the top, which gradually becomes warmer in its descent towards the floor. The great objection to this is that a cold draught too often strikes down upon the scholars, or at least on such of them as may be seated near windows.

These methods failing, let us see what can most easily be done so as to improve the conditions commonly found in our school-rooms. Let us suppose an ordinary room with a large stove in it, as is often found in country schools. Here an outer metal cloak of zincd iron may be very easily placed around it, resting on the floor; and a current of fresh, cold air can be delivered by a tin pipe opening under the stove through the floor, and connecting with the outside fresh air. This air being warmed by the sides of the stove will rise, and the draught will constantly introduce fresh air into the room. Such arrangements may be varied indefinitely according as the position of the room, stove, etc., may prove most convenient. For instance, a double air shaft, according to what is known as McKinnell's design, may be used. However, for the various reasons which I have here and there stated in this address, I believe the most effective means of obtaining a uniform diffusion of fresh air, and at the same time of keeping the air of the room at something like an equalized temperature, is to have the cold air drawn off at the bottom of the room in whatever manner may be deemed best, and have the fresh air warmed and brought in at the upper portion of the room, *e.g.*, where a well-protected inlet at the top—say the window—is made, while a grate stove in the winter, and a candle or small gas jet in summer in the chimney, may serve to create a draught up the chimney. Here we have the two principles well carried out.

Another method which it seems to me could be most efficiently carried out in a school where, let us say, there are eight rooms—four in each flat—is the following:—Let there be at one part of the room, near the floor, an opening in connection with a ventilating shaft, which has at the top a fan, with outward motion of the air, ever kept revolving by

a windmill at the top. This will be a means for getting rid of the foul air. To get fresh air a cylinder may connect with the fresh outer air at the top of the shaft, and be let into the room near the top. The diffusion of the fresh air may be obtained by a tube, carried from such vertical cylindrical shaft horizontally around the top of the room, with openings in it increasing in size as they increase in distance from the shaft.

It will have been noticed that in discussing these principles of ventilation I have ever endeavoured to keep in view the desirability—I might add, the necessity—for not only not chilling the air too much by the introduction of cold outer air, but also of equalizing the air of the room, which in most accidental ventilation, and in many systems of ventilation, is often neglected. But we must pass on to the question of, viz.:—

2. *Sufficient supplies of light.*—Many statements have of late been given of experiments made concerning the question of near-sightedness (*myopia*) in the pupils of public schools. Germany, Russia, Switzerland and France have, by their statistics, shown that the disease of *myopia* is epidemic everywhere in the schools of those countries. Thus it has been shown that in the high school of Chemnitz, Saxony, in eight classes, the proportions of near-sightedness were respectively from the lowest class up, 10, 17, 20, 25, 35, 44, 44, 64 in the 100. Very recently Dr. Mittendorf, of New York, has given the results of his examinations, and has found that in grammar school No. 58 there were $8\frac{1}{2}$ per cent. suffering from *myopia*; in grammar school No. 35, of 630 Germans $17\frac{1}{2}$ per cent. were afflicted with the disease. In all cases it has been found that *myopia* increased with the length of school life. Dr. Mittendorf remarks that the great prevalence of this and other eye diseases in children is due to poor arrangements for light in most school-rooms; and when good, to the placing of the seats so that the rays of light strike the eye in the worst possible way. But, in addition to this, the poverty of the blood and weakness of nerve and muscle fibre, which are produced by bad ventilation, are, according to Drs. Loring and Derby, additional factors tending to this end.

But to proceed with the question of light in schools, we have two distinct problems to be discussed:—1st. The insufficiency of light; 2nd. The bad way in which the rays of light strike the eyes.

1st. *The insufficiency of light.*—All know that the modern theory of light teaches that it moves along in waves, and that light proceeds through all homogeneous media in straight lines from any object, and that these rays radiate from such an object in every direction.

All know, too, that light is transmitted through different substances very differently, giving us the terms transparent, translucent, opaque, but that the most transparent still arrests a portion of the light. Thus Dr. Young estimates that the horizontal sunbeams which pass through about 200 miles of atmosphere ere reaching the eye possess only $\frac{1}{20000}$ of their original intensity.

Thus we are quite ready to understand that, in regard to the effect of light on the eyes, it must vary both according to the intensity of the source and the amount which is allowed to reach the eye.

But we have referred to another point, viz.: that light passes in straight lines. Thus we have often noticed that a ray of light entering a room by a slit in the shutter is mostly localized in a certain direction, that it gives but little light to the rest of the room—what diffusion there is being due first to the law of *refraction of light*, caused by the particles of dust in the course of the ray refracting the rays; and second to another law, *the reflection of light*, by which small amounts of light are reflected into the surrounding portions of the room. By some beautiful experiments Prof. Tyndall has shown that the course of such a ray of light disappears if it is allowed to pass into a chamber where, the air being at perfect rest, the dust has settled upon the bottom and sides of the chamber. Hence we have light diffused by refraction and reflection. But further reflection varies according to the nature of the reflecting surface. Thus a mirror or burnished metal reflects nearly all its light, but mostly in one direction, following the *law of incidence*. A rough surface, or even one such as a white wall or white paper, has every slight unevenness reflecting the light at different angles. Hence we have a scattering of light; and it is entirely to this *secondary radiation* from particles of the air, from the clouds and water vapour, along with the brighter objects in nature, that we owe the generally diffused light of day.

Hence summing up we have, the amount of light which can get into any school, dependent upon :—

1st. Intensity of the rays, dependent upon :—(a) Freedom of air from clouds; (b) The obliquity of the sun's rays; (c) The goodness of the reflecting surfaces, and the direction of the reflected rays.

2nd. The number of rays which can get into a room by means of the size of the window.

Now following up these facts, we notice that, as the rays of light enter the window in right lines, it is only by the diffusion by secondary reflection, either outside the window, or by the particles in the atmosphere of the room and the walls of the room, that a space larger than the window becomes illuminated. This is well seen by the brightness of that portion of room into which the rays of the sun shine directly. But again we remark that the amount of light, or the number of rays entering the room, is subject to the same rule as the light emanating from a candle placed in a dark room. Rays radiating from it pass outward in every direction. Now, should it supply a given amount of light, say x , to a room with a diameter of one foot, to a room of two feet diameter, each foot must receive just $\frac{1}{4}x$. Hence we have daily an indication of what we all ought to do, either as teachers or as individuals.

Thus, at times, it may be necessary to moderate the light by curtains, oftener it is necessary to use every means to increase it. Various methods aid us in this respect. The first, of course, is enough of window space. As the rays of light have a greater intensity in proportion as they approach the vertical, we have one invariable indication, and that is to have the top of the windows as near the ceiling as possible. Hence the farther will rays of light be enabled to reach directly in the room. As a rule then, we may say, that there ought to be no seat in the school which does not receive a certain amount of *direct* rays of light.

Again, if it were possible, we would say that the windows giving this light be placed in the south; but for several reasons this might be found difficult, while if the windows be large enough in proportion to the room this will not be necessary. The rule for allowance in depth of a room for purposes of proper light is that no window shall be required to throw light to a horizontal distance greater than one and a half times its own height, and this is when supposing its height to reach quite near the ceiling.

Again, another point which must be observed is to have the light coming into the room from at most two sides; at any rate, it should be so arranged that the oblique rays from windows on two different sides of the room should not strike the eye at the same time, and this fault is only increased where the light strikes the eye obliquely from windows in the various sides of an octagon, as figured in an article by Dr. Lincoln, New York State Board, and in a school building with which, in my youth, I was very intimately acquainted.

Only one word on the reason for these precautions needs be said. All know that the pupil contracts and dilates with the amount or intensity of the rays of light striking the eye. Now, in no case are rays of light, coming in windows on different sides of the room of quite the same intensity, hence, the pupil, or rather the muscles of the iris, will be more or less fatigued with the constant attempts to regulate the amount of light received. Not only this, but these rays of different intensity are continually impinging upon the retina; and it, too, receiving unequal impressions at different angles, will tend to have its equilibrium disturbed by what we may term the strain upon it. Again, it is most ill-advised to have a glare of light striking upon the eyes of the children at work. Its irritating effects may be, and are, very injurious. The effects of insufficient light, either from insufficient windows, windows not large enough, or from the obstructions external to the room in the shape of verandahs, trees and buildings, are to bring the eye too near the book, or to strain them to see figures on the black-board, and so gradually by fatiguing the muscles of the eyeball and iris to produce short-sightedness.

But, ladies and gentlemen, I am afraid that I have much exceeded the limits of the time allowed me. The duty of cleanliness of drinking utensils, from the possible transmission of contagious disease from one child to another, the desirability of having lavatories both for the comfort and health of the children, and the many dangers common to

all waters—which, from the larger opportunity for harm, ought to be especially guarded against in the drinking water of schools—are all subjects which, had we time, might have engaged our attention with profit. However, we must close. The field in which it is the duty of the school sanitarian to labour is indeed a large one; and in this field I need hardly say that the teachers themselves, who are equal sufferers with their pupils, ought to be eager and earnest workers.

We have fortunately in our school inspectors a *vis agendi*, men who, I have no doubt, are gradually feeling their way towards the introduction of improvements; while I deem you extremely fortunate in having an inspector, a medical man, whose peculiar duty and pleasure it will be to see that the health and comfort, both of teachers and pupils, have thorough provision made for them by the trustees, and parents of the children. But it is not to be supposed that the inspector can undertake this task of school sanitation unaided. The efficiency of this work must largely depend upon the intelligent co-operation with him, not only of the teachers who are more personally interested, but of the public generally, the welfare of whose children ought to be to them the highest end to be sought. Hence we, as a Board, expect, and the Government expects—what, I am happy to say, is being heartily given—cheerful and willing co-operation not in this one question of school sanitation alone, but in the very many others with which we, as a Provincial Board, have to deal. And this will be best accomplished by every municipality establishing an active Local Board of Health, to whom the people ought to yield a hearty allegiance and bow, in what may at times seem the individual interest, to the higher public good.

But all must be happy in knowing that we are progressing, though, as Tennyson says:—

“This fine old world of ours is but a child
Yet in the go-cart. Patience! Give it time
To learn its limbs: there is a hand that guides.”

Our work as Sanitarians has, as yet, hardly more than begun. Zymotic diseases and preventable causes of death are everywhere rampant, and in working for their extermination we will be working for interests as high as those of repelling with patriot hearts and sturdy arms the inroads of the foreign enemy of our country. These enemies of health are all the more potent, because often invisible. Let us then work, gaining—

“Point after point; till on to dawn, when dreams
Begin to feel the truth and stir of day!”

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